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NASOPHARYNGEAL SEPSIS IN 2,056 CASES OF MENTAL DISORDER

THE IMPORTANCE OF CLOSED SEPSIS

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The observations on and treatment of 2,056 cases of mental disorder—mainly certified—by three ear, nose, and throat surgeons working separately during nine years, from 1927 to 1935 inclusive, in the Birmingham Mental Hospital are summarized in the following paragraphs.

Selection of Patients

The cases thus treated have been selected as follows. On admission all patients have had a routine investigation by the medical officer in charge of the case into the mental and physical states, including a preliminary examination for diseased conditions in the ear, nose, and throat. Patients in whom a history or mental or physical symptoms suggested such a condition were further investigated by the visiting rhinologist, employing special methods of examination when desirable. On these findings, and after consultation between the visiting and resident medical staffs, cases thought suitable on mental and physical grounds for further investigation and likely to tolerate the appropriate anaesthesia were selected.

Appropriate treatment was then given, although this stage of active investigation and treatment was not generally carried out until the mouth was free from sepsis. Tables showing the incidence of diseased conditions found and some of the treatment applied in the cases during the past nine years are presented below.

Analysis

Of these 2,056 cases of nasopharyngeal sepsis in mental disorder 1,019 were men and 1,037 women. In 180 cases, 102 male and seventy-eight female, the conditions found clinically did not warrant anything more than a thorough antiseptic irrigation of the cavities explored. In the remaining 1,876 cases, 917 male and 959 female, the following conditions were found and treated.

DISEASE OF THE LYMPHOID TISSUE OF WALDEYER'S RING

Adenoids were found in association with disease in neighbouring tissues in 129 instances, fifty-nine men and seventy women, and were removed. Disease of the tonsils was diagnosed in 1,336 instances out of the total of 2,056 cases—that is, in 618 men and 718 women—and they were removed by blunt dissection in 1,186 cases, 548 men and 638 women. In the other 150, which comprised seventy males and eighty females, tonsillectomy was not possible or expedient. In 175 instances, fifty-nine males and 116 females, the tonsils only were considered diseased, while in 559 men and 602 women—a total of 1,161 cases—a nasal sinus investigation was done at the same time as the tonsillectomy.

DISEASED CONDITIONS OF THE NASAL SINUSES

A general nasal sinus examination was carried out in 1,360 cases, 734 males and 626 females, and in 521 cases, 226 males and 295 females, the investigation was not carried further than antral exploration. In this way a total of 1,881 persons, 960 males and 921 females, were examined by the Watson-Williams technique of suction-exploration.

Clinically diseased conditions of the nasal sinuses were found in 1,425 cases, 743 males and 682 females. The sinuses alone were thought affected in a total of 607 cases, 338 males and 269 females, but in 818 cases, 405 men and 413 women, disease of the tonsils was diagnosed in association with the sinusitis.

DISEASED SINUSES IN INDIVIDUAL CASES

The number of diseased sinuses found in individual cases is set out in the following table:

Number of Sinuses Involved	Male	Female	Total
One sinus only	189	183	372
Two sinuses	205	192	397
Three sinuses	107	105	212
Four sinuses	129	104	233
Five sinuses	51	49	100
Six sinuses	62	49	111
Total	743	682	1,425

Anatomical Distribution of Sinus Disease.—The distribution of the sinus disease whether or not associated with tonsillar disease in these 1,425 cases is shown in the following table:

Affected Sinuses	Male	Female	Total
Antra alone, or with other sinuses	616	532	1,148
Ethmoids alone, or with other sinuses	420	392	812
Sphenoids alone, or with other sinuses	299	274	573

INCIDENCE OF SINUS DISEASE

The following figures give an approximate percentage incidence of the anatomical distribution of the sinusitis in those 1,425 cases in which the clinical findings were positive: antra, 80 per cent.; ethmoids, 57 per cent.; sphenoids, 40 per cent.

Antra.—Here the figures of cases investigated by general nasal sinus examination and antral exploration are combined—namely, 1,881—and, of these, antral disease was present in 1,148 cases—that is, 61 per cent.

Ethmoids and Sphenoid Sinuses.—To show the corresponding incidence of disease in these sinuses only the figures of the general nasal sinus examination can be taken—namely, 1,360 cases. Ethmoidal disease was present in 812 cases—that is, 59.7 per cent.; the percentage incidence of the sphenoid disease was 42.1.

These figures of the incidence of sinus disease in the cases examined by the Watson-Williams technique, based on clinical observation only, are of interest in view of the large number of cases, the great majority being direct admissions during a period of nine years, investigated by three rhinologists working quite independently of each other. They do not include those cases in which bacteriological examination of the wash-outs alone showed the presence of infection.

Closed Nasal Sepsis in Psychosis

In tuberculosis haemoptysis may first draw attention to the disease. Symptoms of general paralysis may be the first indication of syphilis. Mental depression following influenza may continue until an area of residual infection in the nasal sinuses is treated effectively, when the psychotic disturbance passes away. In some cases of nasal sinus disease mental symptoms may be among the first of the signs and symptoms directing the attention of the family or physician to the fact that the patient is ill. In some cases where nasal sinus disease is present an examination of the nasal passages may show only doubtful signs or none at all, the condition being one of closed sepsis. In such cases an inflamed sinus is unable to discharge its exudate owing to closure of its ostium, and as a result internal absorption and extension of inflammation takes place from the diseased membrane.

It is especially in dealing with cases of mental disorder arising from nasal sinus disease that these untoward conditions occur, for here may be shown the truth of the old clinical observation: "As the indications of toxaemia increase the discharge diminishes." Conversely there may be some truth in the assertions of those critics who aver that they have seen hundreds or even thousands of individuals with sufficient pus and sepsis in various parts of their organism to float the proverbial battleship; yet, while they may show symptoms of physical distress, not one of these folk was really insane. These are cases of open sepsis and little toxic absorption. If, however, the capacity to react in this way is reduced or drainage is prevented then complications arise, one of which is the acute mental disorder known as delirium, which sometimes precedes death. Should the patient survive then mental disorder and perhaps certifiable insanity may ensue, and continue, as the result of the persistence in an important site of a small area of "occult" sepsis, which acts as the primary portal of entrance of infection and is responsible for the obvious and dramatic collection of pus elsewhere.

The pathology of this condition is described by Pickworth in his book, *Chronic Nasal Sinusitis and its Relation to Mental Disorder*. An example of this pathology is as follows.

CASE I

A married woman, aged 30, with congenital polycystic renal disease, nephrolithiasis, and nasal sinusitis developed mental disorder, was certified insane, and admitted to a mental hospital, where the nephrolithiasis was found. It was noted that the intensity of the mental symptoms was increased or diminished by conditions which respectively prevented or permitted the free egress of the discharges from the pyonephrolithiasis.

Following removal of the calculus by operation she became delirious and feverish until a subphrenic abscess was opened and drained, when her mental state became normal and she was discharged to her home. She continued well for about three months until, probably as a result of sea-bathing, she suffered a "chill," and again became depressed and was admitted to mental hospital, where once again albumin and pus were found in the urine.

On investigation it was seen that a multisinusitis which previously had been discharging pus on both sides of the nose was now not reacting on one side and only partly so on the other side. After intranasal drainage of these affected cavities there was definitely less pus in the urine, which later became free from pus and albumin. This was associated with further mental and general physical improvement. The patient said that she was now in a better physical state than she had ever been before in her life, and this was supported by the fact that her periods, previously irregular, had now become regular. Mentally she had recovered.

She has during the past seven years since discharge maintained that enhanced psycho-physical vitality in a self-supporting employment. In this case, therefore, the intensity of the psychosis and its type varied inversely with the degree of drainage.

Closed Sphenoidal Abscess in Mental Disorder

The association of a disordered mental state with sphenoidal sinus disease was first described by Jonathan Wright in 1902, when he published *A Case of Isolated, Unilateral, Latent Empyema of the Sphenoidal Sinus with Delirium and Mental Symptoms.* This work has become a classic in this branch of mental disorder. The author had the clinical acumen to conclude from symptoms only that a condition of disease existed in the posterior nasal sinuses and the courage to operate in order to relieve a fellow rhinologist, aged 57, from a condition of intolerable pain and pronounced mental symptoms, enabling him, as Wright has informed us later,

"to live for many years after the operation attending to a large practice and never failing to call me up on the telephone on his birthday and thank me that he was enjoying it. He was operated on for his sphenoidal trouble at a time when operative procedures on that cavity were uncommon, to say the least, and his delirium would have frustrated the present technique in many hands, and my crude method twenty-five years ago was entirely successful in its results."

Yet Wright operated—and it was an operation of no minor magnitude—without any classic signs of disease in the nasal sinuses or nose to support his diagnosis. He even says that "the presence of pus in the nose is not necessary to a diagnosis of sphenoidal disease." The patient had already seen a very distinguished confrere, who had assured him he had no nasal trouble, but advised him to go away for his health. He had been seen by other specialists who were unable to make a definite diagnosis. On Wright's own examination he found

"the nasal mucosa, except for some congestion, was healthy and clean, and there was no especial obstruction to be seen either anteriorly or posteriorly. The middle turbinated bones, while apparently normal, left a very narrow slit in the nose, through which inspection of the ethmoidal or sphenoidal region was very unsatisfactory. Posteriorly a good view of the region was obtained in the rhinoscopic mirror, but nothing especially significant could be noted. Transillumination of the frontal and maxillary sinus gave bright spots over these regions. I was, however, more convinced that the patient had pus under pressure in the left sphenoidal sinus, and perhaps in the posterior ethmoidal cells. This I advanced to the patient as a tentative diagnosis." Later, just after the patient "had spat a foul-smelling cheesy mass from his nasopharynx, I immediately examined his nose and nasopharynx again, but I could discover no sign of pus following the extrusion of the mass, nor indeed any other abnormality. From the fact that no pus had followed the semi-solid mass I was inclined to think the trouble in the sinus might be a malignant growth."

Nevertheless Wright did not deviate from his original diagnosis and "as the patient's condition showed no improvement it was decided to make an effort to explore the sinus." Now what symptoms did Wright describe on which to base his diagnosis of nasal sinus suppuration with occlusion of the ostium?

There was a history of influenza accompanied by severe coryza and left head pain, which latter continued to recur in attacks of increasing severity and duration; there had been severe attacks of sneezing but no nasal discharge. On examination

"his speech was low and his manner dazed. He said he was desperate. The pain in his head was unendurable. In speaking he would raise his left hand to the vertex of the head toward the occiput and bring it down to his left eye and below, which gesture, often repeated, localized the pain better than he could describe it."

There was great hyperaesthesia of the scalp, the breath smelt foul, the temperature was subnormal, the pulse slow, there was some doubtful proptosis of the left eye, but the retinae, apart from slight congestion in the left eye, were normal, as was the vision. Blood and urine were normal. Mentally in the early stages he had been somewhat forgetful, irritable, and emotional, but later he was unable to carry out his work properly, and later still he became delirious. It is submitted that the due recognition of such signs and symptoms as indications of nasal sinus disease would lead to better agreement between workers on this subject.

Closed Antral Disease and Mental Disorder

In the next case there were no signs in the nose suggestive of sinus disease, and the usual deductions from the findings on transillumination of the antra were reversed by the suction-exploration technique of Watson-Williams. Therefore the indications for treatment based solely on the orthodox criteria of sinus disease would have been *nil*, and it is obvious that the resulting inactivity would have been ineffectual in curing the disease or alleviating the symptom-state which arose from it.

CASE II

A housewife, married and aged 46, was admitted to a mental hospital on January 7, 1930; she was discharged on August 7, 1930. An investigation into the family history failed to disclose any evidence of "insane heredity" in three generations. The patient came of what appeared to be a very healthy and long-lived family. She was the mother of six children, all alive and well, and those over school age were all at work.

History.—The onset of the present illness was gradual, beginning about three months before admission. She complained of not being well, but repeated medical examination failed to detect any bodily disease and found incipient nervous breakdown. She became more depressed and slept poorly. Finally she wandered away from home and attempted to cut her throat on January 1; was then admitted to the mental hospital. Her weight was 5 st. 13 lb., height 4 ft. 11½ in. Her general health was poor. No abnormality was found in the chest or abdomen; the blood pressure was 136/88 mm. Hg. The fauces were injected, the tongue moist and clean; she was edentulous. Her headache was frontal and vertical. The face was asymmetrical, the left half flatter than the right. There was left-sided ptosis, and the left angle of the mouth drooped. Both pupils reacted to light and accommodation, though at times the left pupil was one and a quarter times larger than the right. No other neurological signs were detected, except a coarse tremor of the hands. Gynaecological examination and an investigation of the urine were satisfactory; the blood Wassermann reaction was negative. The Widal test was positive to 7 Oxford units to *B. dysenteriae* Y; no abnormal organisms were found in the faeces.

Examination of the ear, nose, and throat gave the following results: anterior nasal spaces, clear; posterior nasal spaces, slight enlargement at the posterior end of the right middle turbinate and enlargement of the right lateral pharyngeal band; tonsils, normal; ears, drums normal; nasal sinuses on transillumination: frontal sinuses, fair; antra, right dull and left clear.

Mental State.—Mentally she was depressed, her emotional control was poor, and orientation defective; recent memory was poor. She realized she was ill, and told a long, wandering, semi-coherent story of "funny turns" and "queer sensations," but was unable to explain what she meant by these terms. She was troubled by a constant buzzing noise in the right ear, but also stated that she heard her children crying and her husband abusing her. During January and February she had amenorrhoea, and was given aloes and iron. The mental state continued as already described with variations in intensity, probably dependent on menstrual irregularities. At one time "the devil" did not bother her as much as formerly, but a month after admission she stated that all her former ideas had come back again, and she was agitated, distressed, and depressed as before. Ultra-violet light and colon irrigations were being given. This treatment continued until the middle of March without any amelioration of the mental state. The lack of response was indicative of the presence of closed sepsis.

Treatment.—A bilateral antral investigation using the Watson-Williams technique now showed: right antrum, clear; left antrum, pus. The cavities were thoroughly irrigated with antiseptic solution but not drained. This was followed by a pyrexial reaction, reaching to 102° F. for three days, and by the return of menstruation during March. Although in some degree better, she was still unstable and had mental and physical exacerbations in relation to amenorrhoea, which recurred during April and May. Both antra therefore were drained intranasally at the end of May, and the menses returned during the second week in June, but on this occasion without pyrexia and without exacerbation of mental symptoms; in fact there was physical and mental improvement.

She was now able to describe the subjective aspect of the development and character of her illness. There had been five sensory disturbances troubling her during the illness: vertical headache; giddiness; bilateral buzzing tinnitus aurium, worse on the right; cacosmia; and cacogeusia. All these had ceased, and only a mild premenstrual frontal headache remained. Life was now worth living. Physically the facial colour, mobility, and tone had much improved and the left facial weakness had passed away. The blood pressure was 164/100 mm. Hg, and her weight was 7 st. 2 lb.

Objectively she had now recovered. She was discharged on August 7, 1930. Seen later her pupils were found to be equal and reacting equally to light and accommodation. During the six years since discharge she has kept well and stood the anxiety of a mental breakdown of her son, visiting him regularly whilst he was in a mental hospital and reporting sensibly on his week-end leaves of absence from hospital. The son, aged 20, made a substantial recovery from a state of adolescent psychosis, of a year's duration before admission, following removal of dental and tonsillar sepsis and of three impacted and unerupted wisdom teeth. Since discharge he has kept well.

Other Illustrative Cases

In the following extracts from three further cases of mental disorder and sinusitis it is sought to show that it is by no means uncommon for closed sinus sepsis to occur in cases of mental disorder in which the indications in the nose or on transillumination of the sinuses are atypical. Other examples of atypical findings are furnished by cases recorded in the annual reports of the Board of Control (Parts II) from 1928 to 1935. The lack or even reversal of the classical signs of sinusitis on

examination of the nasal spaces and transillumination in cases of mental disorder is apt to discourage beginners in these investigations, and it is well that they should realize the problems which confront them.

On the other hand critics cannot in these cases bring the complaint against the Watson-Williams suction-exploration technique that it is not reliable because it can aspirate pus from the nasal passages through the ostia into the sinuses when the sinuses are free from exudate. The careful surgeon should always take care to remove any such pus if present in the nasal passages with tampons of gauze before proceeding to insert the cannulae. In these cases of closed sinusitis, however, where there is no pus visible in the nasal passages it can hardly be asserted that pus found on suction-exploration of the sinuses has come from those nasal passages.

CASE III

In a case of acute puerperal insanity on rhinological examination crusting was found on the anterior end of the right middle turbinate. On Watson-Williams suction-exploration the membrane of the right sphenoidal sinus was found thickened and there was muco-pus in the left antrum.

CASE IV

This was a case of psychosis due to ill-health gradually developing during several years after childbirth. On rhinological examination we found: ears, drums retracted; nose, both inferior turbinates enlarged; throat, pus in both tonsils and a retained abscess in right tonsil. On Watson-Williams suction-exploration muco-pus was found in both antra.

CASE V

In this case routine rhinological examination was impossible owing to the suicidal condition of the patient rendering her absolutely non-cooperative. She was therefore examined under an anaesthetic, when sufficient indication was found to warrant a nasal sinus examination by the Watson-Williams suction-exploration technique. This showed the presence of pus in the right sphenoidal sinus.

Closed Sinus Disease at Necropsy

In two cases of mental disorder closed sinus disease was only discovered at necropsy. In the first of these cases while there was some crusting of the left anterior nasal space, which might have corresponded to the greenish-yellow pus found in the left antrum, there was no free pus visible on removal of the crusts. On the right side the anterior nasal spaces were clear, but there was pus in the antrum at necropsy.

CASE VI

The patient was a male, aged 58, with a history of recurrent nasal sepsis and "hallucinations and delusions" suggestive of some disturbance in the ear, nose, or throat. The blood Wassermann reaction was negative and there was no evidence of syphilis. On ear, nose, and throat examination anterior rhinoscopy showed crusting of the anterior nasal space on the left side; the right side was clear; nothing was seen on posterior rhinoscopy; on transillumination the antra were dim, the frontal sinuses fair; the tonsils were fibrotic, adherent, and septic; the ears were normal; in the mouth there was gross pyorrhoea with many carious teeth and roots, especially in left maxilla and right mandible. Sudden death occurred three weeks after admission and before any operative intervention had taken place. At necropsy the frontal and sphenoidal sinuses were clear, but the left antrum contained much greenish-yellow pus, and in the right antrum there was pus on the medial wall; the tonsils contained pus. Well-marked atheroma was present in the aorta on the semilunar cusps and extending down on to the mitral valve and around the coronary arteries. A patch of atheroma was situated within and completely occluding the left coronary artery for half an inch. The right artery was fairly patent.

In the second case, as a result of clear nasal spaces and satisfactory transillumination findings, the sinuses were not investigated, although the septic tonsils were removed. At necropsy some years afterwards a multisinusitis was found, which was probably present on admission and the cause of the old herpes ophthalmicus.

CASE VII

A single female, aged 58 on admission to the mental hospital on April 27, 1931. A sister was in a mental hospital and an aunt had died there. The present illness was described by another and very capable sister as being gradual in onset, beginning with depression, then delusions of persecution, and finally auditory hallucinations appeared during the six weeks before admission. The patient became increasingly secretive, went for long walks to get away from the "voices," and insisted there was "something working inside her."

On admission she had the scarring of an old herpes ophthalmicus on the right temple. The cardiovascular system appeared normal; the blood pressure was 134/86 mm. Hg. The thyroid was uniformly enlarged. The pulmonary and abdominal viscera seemed normal. The right pupil was slightly larger than the left; both were slightly irregular but reacted to light and accommodation. The urine was normal; the blood Wassermann was negative. She complained of frontal headaches and a bitter taste in the mouth in the morning although she was edentulous. She was self-centred, hallucinated, and deluded. She said that she had a jumping sensation inside her and that people could hear this and consequently men shouted after her.

There was liquid pus in both tonsils. The ears were normal. The post-nasal spaces were not seen; the anterior nasal spaces were clear. On transillumination the antra and frontal sinuses were fair. There appeared to be no indication on this examination for any active treatment beyond the removal of septic tonsils, and this was carried out.

Neither then nor subsequently was any discharge from the nasal passages or other objective evidence seen which might have suggested the presence of sinus disease, and the patient was unable to assist in any way. After the operation a course of non-specific therapy was given, and in the following years there was some evidences of physical and mental amelioration. The sensory disturbances persisted, but the confusion diminished so that she was able to recognize that the "voices" she formerly complained of were really noises in her own head. There was now no active complaint of these, nor of a variable cacosmia and headache, though they continued to occur. The goitre, formerly quite prominent, disappeared. She was able to go out on week-end leave, and even for a month on trial during the winter of 1934–5. In 1935 she became more debilitated, but during this time there was never any evidence of nasal discharge. She died suddenly in June, 1936, aged 63.

At necropsy both sphenoids and both ethmoids contained pus, and the right antrum contained yellowish pus, while the left antrum contained clear mucus. Both frontal sinuses were moist. The stomach walls were much atrophied. The left coronary artery was atheromatous for the length of an inch about half an inch from its mouth.

I wish to acknowledge my indebtedness to my colleagues of the visiting, resident, and research staffs of the Birmingham mental hospital for their observations on and treatment of the cases on which this communication is based.

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According to investigations made by Professor G. Modena, the number of insane under treatment in Italy in 1935 was 110,793, of whom 60,988 were males and 49,985 females. On January 1, 1935, the insane numbered 83,541, and on January 1, 1936, 85,403.

ZINC PROTAMINE INSULIN

A CLINICAL TRIAL OF THE NEW PREPARATION

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In 1936 Hagedorn and his Danish colleagues introduced to the world a new insulin compound, protamine insulin. They had already employed it therapeutically in Denmark for some two years, and it has been on the market in this country for six months under the name Leo "insulin retard." The uses and advantages of this protamine insulin have been described in many articles published in English and American medical journals (Hagedorn, 1936; Joslin *et al.*, 1936; Krarup, 1935; Lawrence and Archer, 1936; Rabinowitch *et al.*, 1936a; Root *et al.*, 1936; Wilder, 1936).

Protamine is a simple protein obtained from the sperm of fishes. At *p*H 7.2 it forms with insulin a precipitated compound, protamine insulin, which is relatively *insoluble* in the subcutaneous tissues, and is therefore more slowly absorbed than is the *soluble* insulin hydrochloride in general use. The latter is so rapidly absorbed that its action is finished quickly, making two or three injections a day necessary for good control of severe diabetes. As many as four and five injections a day have been administered by some workers. Protamine insulin certainly acts for twelve hours, so that it has been possible to ensure a normal fasting blood-sugar level in the morning by giving an adequate dose of this compound in the evening. Hagedorn recommended that it should be used in this way, with soluble insulin in the morning to act quickly enough to control the sugar resulting from digestion of the day's carbohydrate food. We felt, with many others, that an attempt should be made for the patient's sake to control diabetes with a single daily dose of protamine insulin. The results were good with mild cases, but even with very large doses—60 to 100 units—control was seldom possible with severe cases. Fortunately this possibility has been more nearly realized by the discovery of a longer-acting and more stable compound, zinc protamine insulin.

This paper describes the known actions and qualities of the new preparation and the clinical results we have obtained in forty-two patients who could not be controlled by diet alone, and required insulin. The number of cases is small, but the majority have been carefully observed under hospital conditions, and the results have been sufficiently consistent for us to form an opinion on the use, advantages, and disadvantages of zinc protamine insulin. We have also had the privilege of seeing it employed in several Canadian and American clinics, where experimental work was started with it in June, 1936.

Nomenclature

We have felt, since working with more than one type of insulin, and more especially since trying to write about them, that some accepted code of nomenclature is essential to avoid confusion.

Until a year ago "insulin" was insulin, and meant only one thing, at least clinically. Since then protamine insulin has come from Denmark and zinc protamine insulin from Toronto, and it seems likely that improved modifications of these may appear at any moment to add to the confusion of medical nomenclature and thought. The fundamental difference between the "old," "regular," or "ordinary" insulin (but surely insulin will always remain extraordinary, at least to the diabetic) and the new long-action insulins is their solubility at the *p*H at which they are injected. The old insulin is injected in *solution*; the new insulins are injected precipitated in a *suspension* form. We propose to use these terms to distinguish between them. Below are some of the synonyms that are already current:

I. Insulin hydrochloride in solution in weak acid, *p*H 3–4:

Old insulin.	Quick-acting insulin.
Ordinary insulin.	Soluble insulin.
Regular insulin.	

II. Precipitated compounds in suspension at neutral reaction, *p*H 7.2:

Protamine Insulin	*Zinc Protamine Insulin*
Leo "insulin retard" (commercial name)	Protamine zinc insulin
Protamine insulinate	Canadian protamine insulin
Danish protamine insulin	Zinc protamine insulin suspension
	Protamine insulin (with zinc) suspension. (Form adjusted by the Ministry of Health and recently adopted by insulin manufacturers)

When we remember that not only the medical profession but also the diabetic public buy and use these products, the necessity for a clear distinction between them is obvious, particularly in the naming and labelling of commercial preparations. In the past the preparations of soluble insulin sold by different manufacturers have been almost indistinguishable in chemical nature and certainty in clinical action. We hope that steps will be taken to make the new preparations, such as zinc protamine insulin, as uniform as possible in zinc and protamine content and in the type of fish protamine employed.

Zinc Protamine Insulin

The discoverer of this compound is D. A. Scott of Toronto, who had already worked on zinc insulin compounds for several years and had shown that crystalline insulin was a true chemical compound of zinc and insulin, zinc insulinate (Scott and Fisher, 1935). When he turned his attention to protamine insulin compounds he found that when entirely freed from traces of zinc and allied metals they were no more prolonged in action than the soluble insulin hydrochloride (Fisher and Scott, 1935). The addition of traces of zinc and the adjustment of the *p*H to 7.2 produced a zinc protamine insulin compound in suspension which was more stable and more prolonged in its action than any previously discovered. This has been proved experimentally (Fisher and Scott, 1935; Rabinowitch *et al.*, 1936b) both in men and animals, and we find the length of action roughly proportional to the size of dose. The exact chemical nature of the precipitated compound—whether a true salt or merely an indeterminate grouping—is not known. Fortunately it is sufficiently stable to be issued in suspension in one bottle ready for injection. This is an important advance on previous protamine compounds, which had to be issued in two bottles—the buffer separate from the protamine insulin—and mixed by the patient before use. The new compound is a stable fine suspension which sediments on standing; the bottle therefore requires shaking before injection to ensure a uniform suspension. So far only one strength, 40 units per c.cm., has been prepared, but we think 80 units per

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c.cm. will also be necessary for the convenience of patients.

The amount of zinc added is very small—1 mg. in 500 units of insulin—so that even the severest diabetic would not receive more than 1 gramme of zinc in ten years. Zinc in this substance is not toxic, and has not caused any general ill effects.

Action of Zinc Protamine Insulin

The difference in action between soluble insulin and zinc protamine insulin seems to be entirely due to the difference in their rates of absorption from the subcutaneous tissues. Soluble insulin begins to lower the blood sugar from fifteen to thirty minutes after the time of injection. Zinc protamine insulin shows little, if any, effect on the blood sugar in the first three to six hours after injection. The action of soluble insulin rarely lasts longer than eight to ten hours, however large the dose. Zinc protamine insulin continues its action for twenty-four hours when administered in quite moderate doses from 20 to 24 units; in larger doses it will continue to act even longer. The fall in the blood sugar from zinc protamine insulin is more gradual than from soluble insulin, so that severe hypoglycaemia cannot occur soon after the injection, and the violent oscillations between hyper- and hypo-glycaemia sometimes experienced by severe diabetics on soluble insulin are eliminated. These qualities are advantages.

On the other hand, one obvious drawback arises from the slow absorption of zinc protamine insulin. It does not enter the circulation rapidly enough to deal with sugar absorbed into the blood stream from a meal containing 40 or more grammes of carbohydrate. Thus it is usual in a severe diabetic on a single morning dose of zinc protamine insulin to find blood sugars of 180 to 250 mg. per 100 c.cm. of blood soon after food, while a few hours later the blood sugar is normal. There is no return of ketosis with this hyperglycaemia after food. Another disadvantage we have noted is considerable irregularity in action from day to day. This is due, we suppose, to differences in the dispersion of the injections and in the vascularity of the surrounding tissues, so that the precipitate goes into solution and is absorbed at different rates. The action of soluble insulin is much more regular from day to day, no doubt because it enters the general circulation so rapidly and completely.

It seems clear that the normal secretion and action of insulin is not fully imitated either by the soluble or suspension insulins. The probability is (Lawrence and Archer, 1936) that a constant small secretion of insulin from the normal pancreas keeps the endogenous sugar under control, while an added intermittent secretion deals with the exogenous sugar absorbed from carbohydrate digestion. The steady, slow action of zinc protamine insulin imitates the small constant secretion, but cannot control hyperglycaemia after much carbohydrate food. On the contrary, soluble insulin acts strongly and well when given balanced by carbohydrate, but, because of its evanescent action, quickly allows endogenous hyperglycaemia to recur.

A combination of the two types of insulin action is needed to turn the severe diabetic into a physiological individual, and that has not yet been achieved by any single preparation. The next best thing, however, is to mix soluble and suspension insulin in the correct proportions and give them at one injection, so that the soluble insulin controls the post-prandial hyperglycaemia while the suspension insulin comes into action later in the day and keeps the blood sugar normal throughout the night. So far a mixture of soluble and suspension insulin in one bottle has not been produced, but we have satisfied ourselves by clinical experiments that soluble and suspension insulin can be given in the same syringe and injected into the same place and each retains its characteristic action (see table).

Time	Case I Blood Sugar (mg. per 100 c.cm. blood)		Case II Blood Sugar (mg. per 100 c.cm. blood)		
8 a.m.	82	116	272	274	347
10 a.m.	117	209			
Noon	92	209	126	187	333
2 p.m.			183	150	
4 p.m.	81		228	88	
Insulin given 8 a.m.	20 units soluble + 30 units zinc protamine insulin	30 units zinc protamine insulin	30 units soluble insulin	30 units soluble + 30 units zinc protamine insulin	30 units zinc protamine insulin

Breakfast, 9 a.m., 50 grammes carbohydrate; lunch, 1 p.m., 30 grammes carbohydrate.

Clinical Use of Zinc Protamine Insulin

We are convinced that zinc protamine insulin has passed the experimental stages and is ready for therapeutic application. We are sure that one injection a day will maintain all but the most exceptionally severe diabetics in good health; but we are equally certain that we have not had enough experience to lay down hard-and-fast rules for its prescription. We cannot do more than indicate how we have used it and the results we have obtained. As with soluble insulin, it is essential to study each case individually to find the optimum dose and diet balance. We should like to point out, too, that suggestions which seem sound to us from four months' experience may have to be considerably revised in the light of further studies.

With the exception of one patient—who required 500 units a day of soluble insulin and is now stable on 90 units twice a day of zinc protamine insulin—all our patients on zinc protamine have been treated with one injection a day. Since the action of suspension insulin is cumulative, three to six days must elapse before the true effect of any constant daily dose can be assessed.

The Basal Dose

The first step is to discover what we have called the basal dose of insulin—that which will continue its action for twenty-four hours. The correct dose is that which will cause no hypoglycaemia during the night and yet maintain the blood sugar at a normal level before breakfast next morning. We have given 30 units before breakfast as a starting dose, and adjusted it up or down according to blood and urine tests.

Where fasting blood-sugar estimations are not available two specimens of urine should be taken before breakfast: one immediately on waking, to void any sugar which may have entered the bladder soon after bedtime; and a second just before breakfast, to indicate the approximate level of the blood sugar at that time. Even when the first specimen contains sugar the second is often sugar-free, indicating that the dose of zinc protamine insulin is sufficient to last the twenty-four hours. If the second specimen contains sugar the dose must be raised. If there are any symptoms of hypoglycaemia—sweating, palpitations, and trembling between midnight and breakfast—the basal dose is too high and must be reduced. We have

found in many cases this basal dose to be 20 to 30 units; in the more severe, 30 to 50 units.

In the course of establishing the patient on the basal dose of zinc protamine insulin it becomes apparent to which type of diabetic he belongs. The milder insulin case remains sugar-free throughout most of the day on his basal dose of suspension insulin. Sometimes there is slight hyperglycaemia in the early forenoon, a time when the injection of the previous day is exhausted and that of the same day not established. Fig. 1 shows a series of blood-sugar estimations on such a case throughout the day.

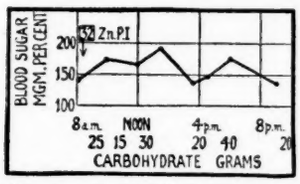

FIG. 1.—Blood-sugar curve after twenty-one days on zinc protamine insulin.

The Addition of Soluble Insulin

The severe type of diabetic cannot be kept well controlled throughout the twenty-four hours by a single dose of suspension insulin in the morning, and tends to pass large amounts of sugar, but not acetone bodies, after each meal. This cannot be overcome by increasing the basal dose, because hypoglycaemia is certain to appear between bedtime and breakfast. It can be mitigated by cutting down breakfast and lunch carbohydrate to a very low level, but this is undesirable and the patients naturally dislike it. The obvious treatment is to give soluble insulin along with the basal dose of zinc protamine insulin, and fortunately we have found that they can be mixed in one syringe and injected together, and yet retain their separate qualities of action (see table and Fig. 2).

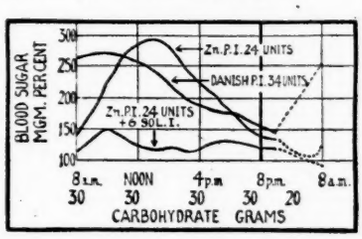

FIG. 2 shows the effect of different insulins given at 8 a.m. Zinc protamine insulin 24 units acts longer than Danish protamine insulin 34 units, but controls the day's carbohydrate food poorly. The addition of soluble insulin rectifies this.

If the urine is sugar-free before breakfast a mixed dose should be administered almost immediately before food, as a longer interval may result in hypoglycaemia before the carbohydrate is absorbed. Another plan we have tried is to inject the basal dose at bedtime instead of before breakfast. In this way its minimum action coincides with the hours of sleep and its maximum with the intake of the day's food. This has worked satisfactorily in six patients; one patient had slight hypoglycaemia at 5 a.m. on a dose of 30 units at 10 p.m. When finally stabilized her basal dose proved to be 14 units. The blood sugar is generally controlled for about eighteen to twenty hours, but the evening's carbohydrate meals lead to heavy glycosuria. We think that most patients will be better controlled when given suspension insulin before breakfast rather than at bedtime. When it is necessary to add soluble insulin to the basal dose this must be taken before breakfast; the mixed dose administered at night would certainly result in hypoglycaemia.

Diet and its Arrangement

It has become the general practice to allow liberal amounts of carbohydrate in the diet of diabetics on insulin. Diets containing 120 to 200 grammes of carbohydrate can be tolerated very satisfactorily on zinc protamine insulin, but the carbohydrate distribution must be carefully arranged. It is customary with soluble insulin to order most carbohydrate at the two meals which follow the morning and evening injections, 150 grammes (g.) being taken as:

Insulin ↓ Breakfast: 50 g. Lunch: 30 g. Tea: 20 g. Insulin ↓ Dinner: 50 g.

The action of a basal dose of zinc protamine insulin is slow in beginning, gathers strength, acts for twenty-four hours, and may produce hypoglycaemia any time when no carbohydrate has been taken for three to five hours. Therefore the carbohydrate must be spread throughout the day in smaller and more frequent feeds than were advised before. We consider an afternoon tea and a bedtime feed essential to prevent hypoglycaemia. A suitable arrangement of 150 grammes would be:

Insulin ↓ Breakfast: 30 g. Lunch: 30 g. Tea: 30 g. Dinner: 40 g. Bedtime: 20 g.

In severe cases, where soluble is added to suspension insulin, more carbohydrate should be given at breakfast-time—for example, 50 grammes instead of 30 grammes. Variations in the amount of carbohydrate at each meal should be made in each individual case to strike the best balance between glycosuria and hypoglycaemia.

Hypoglycaemia

Soluble insulin exerts its main effect from three to six hours after injection and therefore its overdoses occur between these times. The onset of hypoglycaemia from zinc protamine insulin is quite different, coming much later in the day. Both have a later hypoglycaemic action when administered in large doses. We have found that 15 to 25 units of zinc protamine insulin act most strongly eight to twelve hours after injection, a morning dose causing hypoglycaemia before tea or before dinner; while 25 to 30 units act most strongly fourteen to twenty-two hours after injection, causing hypoglycaemia during the early hours of the morning, or even just before breakfast next day.

Hypoglycaemia is more subtle in onset, and on the whole subjective symptoms are less severe than with soluble insulin, but we believe that the sense of security produced by these observations is a false one. Preliminary symptoms of shakiness, sweating, and palpitation, usually ascribed to an adrenaline reaction, may be absent when the blood sugar is 40 to 60 mg. per 100 c.cm. of blood. On the few occasions that we have been able to take blood for sugar estimation when symptoms of hypoglycaemia were actually present, the blood sugar has been exceedingly low. It was noticed that a patient was sweating and trembling a little when blood was taken from his ear one evening. He said he noticed nothing himself except feeling rather cold. The blood-sugar concentration was 39 mg. per 100 c.cm. of blood. Thus the patient is liable to develop severe hypoglycaemic symptoms without warning. This has happened to four of our patients at home, although never under hospital conditions. The new treatment of these four was being worked out without admission to hospital, because this had seemed justifiable in view of their knowledge and experience as trained

diabetics. The experience has warned us against changes to the new insulin except under close observation. The possibility of severe hypoglycaemia is certainly not eliminated with suspension insulin.

Beginning Treatment in New and Old Cases

It must be remembered that zinc protamine insulin is slow in coming into action, and a constant dose does not show its full cumulative effect for three to six days. It is advisable, therefore, at the beginning to prescribe soluble insulin as well—at all events if we wish to assess the final dosage quickly in hospital or a nursing home.

In new untreated cases loaded with sugar and acetone we give a moderate dose of soluble insulin, 10 to 20 units, either before the evening meal or with the morning basal dose of 30 units of zinc protamine insulin, and sometimes in severe cases at both times to bring the sugar quickly under control. These added doses of soluble insulin are diminished in two to four days, when the full effect of the basal dose is established. Soluble insulin is omitted altogether in the milder cases, but will be necessary permanently in the more severe types, and is administered in the morning to assist the basal dose of suspension insulin.

In transferring old insulin cases to one dose of zinc protamine insulin the continuation of some soluble insulin for two or three days is necessary if a heavy relapse of sugar is to be avoided. Usually we try as a basal dose three-quarters of the previous total dose of soluble insulin, seldom more than 40 units, with the addition of half the previous morning dose of soluble insulin. The latter addition will gradually be adjusted, reduced, or omitted as the basal dose comes into full action. We must repeat, however, that every case should be watched closely at this stage and judged by the results of urine and blood tests. With our meagre experience we cannot lay down any definite rules for making the change quickly which may not either produce unnecessary hypoglycaemia or allow too severe a relapse in the diabetes. We feel, and experiences from America agree, that the change in severe insulin cases should be made under close observation to avoid danger and to get the best results.

Comparative Dosage of New and Old Insulin

When large doses of soluble insulin are given to severe diabetics much is wasted, either by destruction in the tissues or more probably by excretion in the urine. The wastage of the slowly absorbed suspension insulin is much less. The basal dose is likely to be at most only some 75 per cent. of the total previous insulin dosage; sometimes we have found it considerably less. The addition of small amounts of soluble insulin necessary in some cases is still likely to leave the total number of units less in the new than in the old treatment. We have had to use far smaller doses of zinc protamine insulin than of Leo "insulin retard" in cases which we tried to control on one big morning dose alone.

Insulin in Diabetic Coma

Urgent clinical ketosis demands rapid insulin action, and for this reason soluble insulin is often given intravenously to patients in diabetic coma. Whether zinc protamine insulin intravenously is as efficacious we do not yet know; until this is established the old methods of treatment must stand as best.

We have found that zinc protamine insulin is very useful in the treatment of diabetic coma when injected subcutaneously in addition to intravenous or subcutaneous soluble insulin. The suspension insulin administered at the beginning of treatment comes into action six or eight hours later, maintaining, by checking any recurrence of hyperglycaemia, the improvement already secured by the soluble insulin.

General Observations

New severe cases stabilized on one injection daily of zinc protamine insulin show the same marked clinical improvement as similar cases treated with several injections daily of soluble insulin. Ketosis and all acute symptoms of diabetes disappear within two or three days; glycosuria and hyperglycaemia more slowly. The usual rapid gain in weight of four to ten pounds is seen in the first week, and energy and health are rapidly restored. Those who wish it return to their ordinary life and full occupation in two to three weeks. As has been the case before, such newly treated diabetics gain considerable carbohydrate tolerance, and the insulin can be reduced in the following weeks.

A striking feature is complete absence of ketosis throughout the twenty-four hours, much more complete than we have ever obtained by three doses of soluble insulin in severe cases of diabetes. Even during the period of hyperglycaemia and glycosuria after a meal there is no recurrence of ketonuria as judged by the sensitive nitroprusside test. It appears that the worst defect of diabetics, the endogenous production of new sugar and acetone bodies, is incomparably better controlled than ever before.

Exercise raises important considerations in the use of the new insulin. It is well recognized that unusual exercise makes diabetics on soluble insulin more liable to hypoglycaemia, but this is limited to the time of its maximum action, which can be foreseen and avoided. Suspension insulin, however, with its prolonged action, will make unusual exercise apt to produce hypoglycaemia at almost any time of the day, and this should be prevented by giving extra carbohydrate before or during exercise. This is more rational than a reduction of the basal dose, because an adequate reduction of the latter would permit recurrent hyperglycaemia next morning. So far we have had no difficulties with patients leading an active life, one being a strenuous engineer mechanic and another playing football one afternoon every week.

As usual, new cases coming for treatment soon after onset respond best and are most easily managed. Severe diabetics who have already received soluble insulin over a long period require close study during the change-over to zinc protamine insulin. In two such cases treated as out-patients the new treatment had to be stopped on account of irregular action of suspension insulin, which allowed heavy glycosuria on some days and severe hypoglycaemia on others for no obvious reason.

We would hesitate to change to suspension insulin the large number of patients who are well controlled in perfect health and do not mind two injections a day of the soluble insulin. This applies especially to those whose conditions of life are very irregular, as they would be exposed to the danger of hypoglycaemia whenever they missed a carbohydrate meal necessary to balance the long action of zinc protamine insulin. We would remind readers of the irregularity of action from day to day which zinc protamine insulin as well as Danish protamine insulin shows when compared with soluble insulin. On any one day tests which are better or worse than the average may be obtained, and caution in raising or lowering the basal dose on one day's testing should be observed.

From what we have seen of the long action of zinc protamine insulin it seems unlikely that a still longer-

acting insulin—to be injected, let us suppose, once a week —could ever be successful ; it would cause hypoglycaemia every night, and the patient's condition would be comparable to the rare syndrome of spontaneous hypoglycaemia. It is clear that the basal dose must be "tailing off" in strength of action at night.

Summary

1. The chemical nature and physiological action of zinc protamine insulin is described.

2. We have used it as one dose a day, from 16 to 50 units, in forty-two insulin patients of all grades of severity. In all cases the urine passed twenty-four hours afterwards can be made sugar-free and the blood sugar normal or nearly so. In many severe cases hyperglycaemia and glycosuria after carbohydrate meals, especially breakfast, cannot be controlled by such a dose of zinc protamine insulin alone, but can be better regulated by the addition of a suitable dose of soluble insulin injected in the same syringe.

3. The adjustment of diet, the dosage of insulin, and the possibility and prevention of hypoglycaemia are discussed. We consider that careful study of each case is essential.

4. We conclude, so far as our limited experience goes, that most severe diabetes can be well controlled and the patient maintained in excellent health by one injection a day, either of zinc protamine insulin suspension alone or with the addition of some soluble insulin. The initial stages of such treatment should be carried out under close observation.

We wish to thank our patients for their keen co-operation, and the nursing staff and the dietetic and laboratory staff in our department for loyal assistance in the extra work which these studies have required. We are indebted to Professor Best of Toronto for our first supply of zinc protamine insulin, and to Messrs. Boots Pure Drug Co. Ltd., who have supplied large quantities free since November, 1936.

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M. Schubert (*Derm. Wschr.*, December 19, 1936, p. 1653) believes with Miescher, Musger, and Kogoj that lichen sclerosus atrophicans represents an idiopathic affection, having the following characteristics: some spots are rounded or polygonal, of irregular but well-defined outlines. Their colour is bluish-white. They are either of the same level as the surrounding skin or slightly prominent or inversely slightly sunk. The surrounding skin is not red, but may show a slightly pigmented ring. Some of the spots develop into verrucous foci of grey-brownish colour with more or less extensive whitish margins. Small spots may coalesce to form large irregular but well-delimited foci of the colour of porcelain. There are also sunk, smooth, white, rounded scars with fine telangiectases. The affection can be distinguished both clinically and histologically from lichen ruber planus and from the circumscribed sclerodermia, although there are transitional forms between lichen sclerosus atrophicans and the last-named two affections. The author prefers to call the disease "lichen sclerosus atrophicans" rather than "white spot disease" (Weissflecken Krankheit).

THE NOCIFENSOR SYSTEM OF NERVES AND ITS REACTIONS*

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LECTURE II

The three reactions described in the first lecture were all discovered by observations carried out exclusively upon human subjects. The fourth, to which I now come, was first described in animals, and has been submitted to close experimental investigation in these.

4. The "Antidromic" Flush

The first definite statement of vasodilator nerves in the posterior roots was made by Stricker in 1876. But his observations remained unaccepted until Bayliss's careful experiments were recorded in 1901. Bayliss (1900–2) found that stimulation of the distal ends of the cut posterior roots by current, or mechanically, produces a long-lasting vasodilatation of the limb supplied. He showed that the cell stations of the fibres conducting the impulses to the vessels lie in the posterior root ganglia, for the effect remains after the posterior roots are cut, but is lost after the ganglia are excised. He concluded that the fibres concerned are the ordinary sensory afferent fibres of the posterior roots and that vasodilatation of the limb is effected by "antidromic" conduction, as he called it at Langley's suggestion. Similar vasodilatation can be produced by stimulating the distal ends of nerves to the limbs or cutaneous nerves, and these reactions have been studied by Langley (1923–4) and by myself and others (Lewis and Marvin, 1927), mainly in the cat's paw. Foerster has shown in recent years that reddening of the human skin over appropriate segments occurs when the posterior roots, or nerves of the limb running to the skin, have been cut and are stimulated distally. In the case of the cat stimulation of a small nerve of the paw flushes the bare surfaces of those pads which the particular nerve supplies, and flushes them sharply to a boundary. Langley first observed this, and, adopting my method of identifying active capillary dilatation, found that the flushing is produced even during circulatory arrest. He therefore, and rightly, concluded that the flush is due to capillary rather than to arteriolar dilatation in this animal.

The conception that the vasodilatation is due to antidromic conduction in sensory nerve fibres was grounded upon the contemporary belief that all posterior root fibres are afferent. Several workers (Ranson, Kuré, Tower) have since described intact fibres in the spinal ends of the cut posterior roots many days after section. These have been much discussed, and have generally been regarded as regenerated from the root ganglion. But Kahr and Sheehan (1933) traced intact fibres in this root after removing the ganglia ; and Barron and Matthews (1934–5) have recently supplied some remarkable evidence, both physiological and anatomical, that fibres having their cell stations in the posterior root ganglia pass into the cord and send collaterals out again through neighbouring posterior roots on their way to the periphery. It seems from the observations of Matthews that these fibres normally carry impulses out to the periphery ; but if that is so then it is difficult to regard the system of nerves in question as subserving a sensory function. Thus the evidence from this source inclines us to recognize that there are fibres other than sensory in the posterior

* The Hume Lectures delivered at Newcastle-on-Tyne, February 4 and 11. Lecture I was published last week.

root system, and in this respect it is harmonious with what has been concluded in earlier parts of these lectures. Although the posterior root's constitution is being closely re-examined by physiologists, and especially in relation to what has hitherto been called "antidromic" conduction, we do not yet know quite certainly that vasodilatation is ever provoked naturally through posterior root channels; neither are the fibres that give this response to artificial stimulation positively identified.

The idea that the vascular dilatation under discussion results from the release of an appropriate substance peripherally was first put forward on a definite basis by Marvin and myself in 1927. Langley apparently first suggested to Bayliss that such a substance may be released; but as there was then no tangible evidence for such release Bayliss considered it unfavourably. Langley recorded his idea later (1923), though I have been unable to ascertain what prompted him, unless it was his conclusion that the effect is capillary rather than arteriolar. The idea came to Marvin and myself independently when we noticed the long delay in the appearance and disappearance of the vascular reaction in response to short stimulation in cats, for these time relations reminded us of those of the flare in response to local injury. We sought for a means of testing the matter crucially and found it in arrest of the circulation, which by holding the released substance in place prolongs the reaction by just that period of time over which the blood flow is arrested. This experiment not only gave us evidence of a released substance but showed this substance to be relatively stable. We regarded the substance responsible for flushing of the pads of the cat's foot as a histamine-like substance acting upon the minute vessels of the skin. A few years later Kibjakow (1931) reported vasodilator substance in blood returning from a paw during distal stimulation of the posterior roots, but his evidence was unconvincing. More recently Ungar and his associates (1935) have found similar stimulation to result in increased secretion of hydrochloric acid in the stomach, a well-known effect of introducing histamine into the circulation. To these observations, which indicate histamine release, Wybauw (1936) has quite recently added others strongly supporting the view, first inferred by Dale and Gaddum in 1930, that there is a release of another natural vasodilator substance—namely, acetylcholine. Thus it becomes possible, if not probable, that there is a twofold release, H-substance playing upon and directly dilating the capillaries, and acetylcholine acting upon and dilating the arterioles.

I emphasize these peculiar effector reactions because they tend in themselves to separate the nerves concerned from the sensory system and to place them in the category of those of the nocifensor system, which are known or are suspected to produce their effects through the intermediary of cutaneous cell products.

General Hypothesis of "Nocifensor" Nerve Effects

In earlier parts of these lectures I have described, first, how hyperalgesia spreads around a local injury; and secondly, how similar hyperalgesia appears in the territory of a cutaneous nerve stimulated distally. Thirdly, I have redescribed the chief phenomena of the flare produced around a local injury; and fourthly, the vasodilatation following distal stimulation of posterior nerve roots or cutaneous nerves.

When we view all these four together they appear linked, for each reaction of hyperalgesia seems to have its vascular counterpart. The two reactions of hyperalgesia clearly employ an identical effector mechanism; the third employs the same or a closely related mechanism. All these three employ nerves of the posterior root system, but not sensory constituents; the fourth also concerns nerves of the posterior root, but nerves which we begin to regard as probably not sensory. The term "nocifensor" was first applied to the first two reactions; I widen it to include the third reaction, the "flare." This widening of definition means perhaps that we must recognize fibres of separate function within one special system. The inclusion of the fourth reaction, despite seeming close linkage, should, I think, still wait on time and further observations. It is the least solidly established within the nocifensor group. Difficult as it may be to believe that it is not of the same category, some evidence remains which makes its inclusion uncertain. When both posterior root vasodilatation and "flare" were thought to depend on sensory nerves, one system for the two reactions was a natural conception; but the identity of the nerves underlying these two reactions has not been proved.

Vasodilatation from nerve trunk stimulation in the cat's paw is largely a minute vessel effect, and this is associated with release of a stable vasodilator (histamine-like) substance. No evidence has been found that the capillaries play an active part in the flare phenomenon, though it has been sought closely and repeatedly. And, consistently, none has been found that stable vasodilator substances are released in the flushed skin; on the other hand, the evidence is opposed to such release.* It may be that this difference in the type of vascular reaction has been found because the reactions have been studied in cat and man respectively, and are not strictly comparable. On the other hand, the difference may be fundamental. A second seeming disagreement is found between the characteristics of the nerves; for whereas I find the flare reaction abolished in relatively early stages of asphyxia, and at a time when slow-conducting nerves of the skin are still functioning, Hinsey and Gasser (1930) associated the vasodilatation of posterior root stimulation particularly with the slow-conducting fibres.

5. Reaction to Cold

There is a vascular reaction, certainly related to those already described, and one of obvious importance in defence. I discovered this reaction while investigating the sensation of warmth that develops in the fingers when they recover from handling snow (Lewis, 1930). If a single finger is immersed in ice-cold water, kept there for five or ten minutes, and then withdrawn, this finger warms up very rapidly and becomes even hotter than its fellows. Investigation shows that the vasodilatation happens while the finger is actually exposed to cold. The finger in its cold bath is at first painful, but after a time the pain, and even the sense of coldness, vanishes. A thermal junction strapped to the end of the finger shows at this time that the temperature has ceased to fall and is beginning to rise. So great is the fully developed vasodilatation that the thermal junction may show a rise of 5° or 10° C. (9° or 18° F.) above its low point of cooling while the finger still remains immersed in ice-cold water. The reaction lasts ten to thirty minutes and subsides, the finger cools again, and the events are repeated. Thus the immersed finger is kept at a temperature in the average well above freezing-point. To display the reaction it is unnecessary to cool to this degree; immersion at 5° or 10° C. (41° or 50° F.) provides quite obvious reactions, and there is a distinguishable response when cooling goes no lower than 15° C. (59° F.) or even 18° C. (64° F.).

* It is to be stated that the evidence referred to (Lewis, Grant, and Marvin, 1927) does not exclude the release of an unstable substance such as acetylcholine, but here this is not the precisely relevant point.

These reactions are not confined to experiments arranged within doors; they occur naturally in cold weather out of doors. In walking out of doors in cold air, or in working with hands in cold water, it is usual for the temperature of unprotected hands to fall almost to that of their surroundings. But they do not remain cold in healthy people, when they have cooled to a certain point, which may be reached in a half-hour or more, they react and become warm again. It is clear, from the range of provocative temperature, that the reaction must come into very frequent play during the colder months of the year in northern climates. The importance of this reaction as a protective mechanism against prolonged overcooling is emphasized by considering the remaining responses to cold. When the surface of the body is cooled general vasomotor tone increases; at the same time the digital arteries respond directly to the cold by contracting; this contraction, by lessening blood supply, exposes the finger to further loss of heat and to further constriction of its vessels. Thus these two factors, acting alone, would inevitably bring about advanced and stable arterial spasm; such spasm is avoided or is relieved by the intervention of the reaction here described.

The reaction is found in the fingers and toes, the palms and soles, the lobe of the ear, the nose, and the chin. It seems to be especially well provided for just where it is wanted—namely, in parts of the body that project, have large surfaces, and are easily cooled. It is most conspicuous in the digits, which cool more than any other part, and these are richly provided with arteriovenous anastomoses, which vigorously participate in the response (Grant and Bland, 1929–31). I have recorded the reaction in the cat's paw, and Grant has studied it in the feet of birds and ears of rabbits.

The underlying mechanism is nervous. The reaction occurs in man after section of the mixed nerve to the skin up till the time of its degeneration, but not afterwards; and it is present after sympathetic degeneration. Thus the reaction happens as a local axon reflex in nerves belonging to the posterior root system, like those previously described. This conclusion, which I arrived at from my original observations upon human fingers, has been confirmed recently by Wybauw for the cat's paw (1936); the reaction is maintained after posterior root section, but is lost when, after ganglionectomy, the nerves degenerate. From my earliest interest in this subject, more than seven years ago, I took the view that the mechanism constitutes an important contributory means by which the temperature of exposed parts is normally maintained and the skin guarded against seriously injurious cooling; and that the fall of temperature of fingers deprived of their mixed nerve supply, as in injuries of peripheral nerves, is due to the loss of this local reflex. This view has been corroborated by later observations, many of which have been published with Dr. Pickering (Lewis and Pickering, 1936), and quite recently by Wybauw, who finds that the cat's foot deprived of nerves of the posterior root system by ganglionectomy (ensuring degeneration) becomes habitually lower in temperature than the foot to which the roots have been cut proximally to the ganglia.

In my earliest account of it I took the view that the reaction described is comparable to the "flare," and regarded the stimulus to the reaction as the same as that arising in acute injuries of the skin—namely, the release of H-substance. But there have been minor objections to the view that the reaction is equivalent to that occurring in the triple response (Grant, Bland, and Camp, 1931–3). There is no doubt in my mind that the stimulus cold injures the skin and releases a substance, but this substance is not necessarily the histamine-like substance which underlies the "flare." There is also no doubt that in ice-cooling the nocifensor nerves are stimulated. The finger which has been immersed and reacts becomes hyperalgesic, and this hyperalgesia spreads in susceptible subjects, and, when the finger is the fifth, to the whole cutaneous area of the ulnar nerve. A vascular reaction has never been detected, however, beyond the limits of the finger cooled. The proved nocifensor element in the reaction is hyperalgesia; the associated vascular reaction may be comparable to that of the "flare," or it may be more akin to that which has been termed "antidromic," assuming the two last to be really separate. Thus it will be gathered that the vascular reaction to cold, like those previously described, is probably to be reckoned among "nocifensor" reactions, though its precise relation to the remainder has not yet been determined.

It is tempting to bring all the five reactions described unhesitatingly together and definitely to ascribe them all to the same system of nerves; such an idea has indeed very much to support it, but the conclusion cannot be drawn in the present state of our knowledge with the finality that we might desire.

Trophic Nerves

It is desirable to refer briefly in these lectures to the old hypothesis of "trophic nerves."

The term "trophic change" was introduced to imply a change of nutrition. Early in the nineteenth century emphasis was laid upon the control of nutrition by the nervous system and upon the possibility of lesions arising out of disease of the brain or spinal cord. Thus in 1831 Mitchell was attributing acute joint trouble to irritation of the spinal cord. By the time Charcot (1872–3) gave his well-known lecture on disorders of nutrition, and largely as a result of his work, the idea had taken fast hold; as he said, "there is nothing better established in pathology . . . than the existence of trophic troubles consecutive to lesions of the nervous centres or of the nerves." The truth of this statement is no less obvious to-day than in 1872 when it was written. When a motor nerve is cut the muscle atrophies; when the nerve to a secreting gland is cut the gland changes. Disuse, acting directly, and diminished blood supply, whether primarily the result of a nerve lesion or as so often happens itself the result of disuse, are two common and well-recognized channels through which nervous diseases cause trophic change, using the term in its literal sense of nutritional change. Relevant examples are many, but they are diverse. If we allow the word trophic a wider meaning, and include inflammation, then we may cite as further examples of neurotrophic lesions such ulcerations of eye or foot as can be attributed partly or wholly to insensitiveness of the corresponding structures and to injury arising therefrom. Sherrington (1900) aptly said "that every nerve and nerve centre that can influence the proper and specific activity of a tissue—and that is the sole function of nerves—possesses, in so far, a trophic influence on that tissue. If by trophic nerve be understood no more than this, all nerves are trophic nerves."

But more than this has often been inferred or implicitly stated. A notable instance was that of Claude Bernard (1852), who at first misinterpreted the function of the cervical sympathetic, regarding it as controlling metabolism, but abandoned the view when Brown-Séquard and he recognized its vasomotor function. The hypothesis of special "trophic nerves" came from Samuel in 1860. He believed in nerves *sui generis*, directly influencing nutrition, growth, and new cell formation, and

capable also of provoking inflammation. He ascribed separate effects to their paralysis and to their stimulation, and brought an array of experimental and clinical evidence into support of his views. His experiments though numerous were crude, and possess little value to-day. On the clinical side he cited many previous reports, and followed Brown-Séquard's view (1859) that herpetic eruptions after nerve injuries are irritative and Baerunsprung's attribution of zoster to affection of the spinal ganglia. Tangible evidence for the existence of a distinct system of nerves having the functions he ascribed to them is not to be discovered in his book, and his hypothesis rightly won little credence; there has been no reason to believe that nerves influence the nutrition or growth of tissue directly, but only indirectly by altering blood flow or by controlling the tissue's specific function. But although Samuel's hypothesis failed he was right in stressing as unexplained the apparent effects of nerve irritation. The mystery of the cases that have come to be called "causalgia" has remained; when Brown-Séquard concluded such lesions to be the result of irritation he may have been correct, but this fails to satisfy. Samuel's suggestion that they result from the excessive action of his special nerves of nutrition, an overaction exploding in inflammation, was not grounded on proper evidence; but it contained an element of truth. For according to our present evidence distal stimulation of cutaneous nerves does provoke some of the phenomena of inflammation—namely, hyperalgesia and reddening—and may conceivably provoke more. And it is of further interest to remark that while we cannot follow Samuel in regarding the nerves involved as special nerves of nutrition, we are coming to regard them as nerves exercising a special function, termed for convenience "nocifensor."

Conclusion

We have concluded that a specific system of nerves, connecting to at least the skin, exists. This system of nerves is capable of effecting changes in the skin locally and without reference to the central nervous system, though very possibly also capable of excitation from brain or cord. In speculating about the mode of action of these nocifensor nerves with a view to presenting a fuller if more hypothetical conception of them we might venture to suppose that they are nerves exercising no direct influence upon the nutrition of the skin but comprising in their actions an influence more akin to a process of secretion—and in parenthesis it is interesting to note that Charcot inclined to interpret Samuel's ideas in a similar sense. We might regard the nerves as liberating potent substances from cellular elements of the skin into surrounding spaces, and thus controlling partly or wholly within the skin important elements of defence, including inflammation.

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ACTIVE IMMUNIZATION AGAINST TETANUS

BY

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Passive immunization against tetanus was used with considerable success during the great war. In October, 1914, there were thirty-two cases of tetanus per 1,000 of the wounded admitted to the hospitals in England, but in November, after the general adoption of passive immunization of the wounded, the incidence fell to 1.7 per 1,000, and among those cases which did occur the mortality was lower.

Objections to Passive Immunization

Passive immunization, however, has serious disadvantages. Antitoxin, to produce the best effect, should be injected within twenty-four hours of sustaining the injury; this, for several reasons, may in many cases be impracticable. Another disadvantage is that antitoxin from the introduction of a foreign serum quickly begins to disappear from the circulation, and within a fortnight is no longer in sufficient concentration to afford protection; the injection has to be repeated at weekly intervals and before any subsequent operation is undertaken, since tetanus bacilli or spores may remain latent in the tissues for a long time.

Another serious drawback is the sensitization to horse serum, which to a greater or less degree follows immunization with antitoxin derived from immunized horses, a sensitization continuing for many years. Troublesome serum reactions, and even severe and in some cases fatal anaphylactic shock, may accompany or follow the subsequent injection of a therapeutic serum which may be urgently required in the treatment of an infection such as diphtheria.

Sensitization also considerably diminishes the immunizing effect of a further injection of serum. Glenny and Hopkins (1922) found that while in the case of a normal rabbit the titre of antitoxin in the blood dropped to a low level in twelve days after the intravenous injection of antitoxic horse serum, in the case of a rabbit sensitized to horse serum the same low level was reached in four days. Kahn and McDermott (1934) found that while the injection of 5 units of diphtheria antitoxin could protect a normal rabbit against fifty minimum lethal doses of diphtheria toxin, 75 units were required when the animal was sensitized to horse serum.

Tetanus Toxoid

Active immunization by tetanus toxoid has none of these disadvantages. There is no more difficulty in immunizing against tetanus than against diphtheria; it is quite free from danger and the result is just as satisfactory. Complete and permanent immunity is obtainable. A commission to study the question of prophylaxis against tetanus in the French Army strongly recom-

mended the adoption of wholesale immunization with toxoid in the place of passive immunization with antitoxin, which latter should be reserved for any of the wounded who might not have been actively immunized, and even in that case only as a preliminary stage in active immunization.

Ramon and Zoeller (1927) immunized several hundred persons by three injections of toxoid given in the same way as diphtheria toxoid. The antitoxic content of their serum subsequently averaged from 0.3 to 1 unit per c.cm. After four years the titre had dropped considerably—to from 1/500 to 1/6 unit per c.cm.—but the injection of another dose of toxoid raised the antitoxic content of their blood to 3 units per c.cm. After the injection of 1,700 units of antitoxic serum the antitoxic titre of the blood does not reach more than 0.17 unit per c.cm., and that for a few days only.

P. A. T. Sneath and E. J. Kerslake (1935) in Toronto estimated the antitoxic content of the blood in persons who had been immunized by the subcutaneous injection of three doses of tetanus toxoid. Thirteen of them were examined two years after the immunization. The titre of antitoxin remained at much the same level as it had been twelve months previously; in three of these there was 0.1 unit per c.cm. Another injection of toxoid was then given, and within a week in eleven out of the twelve the titre had risen to amounts between 1 and 10 units per c.cm.—from ten to five hundred times the former level. One person responded poorly to immunization, and in this case the titre did not rise above 0.025 unit. Horses differ greatly in their response to immunization, and it is not surprising that human beings differ in the same way. The efficiency of the antibody producing activity of the reticulo-endothelial system, and consequently the response to immunization as indicated by the antitoxic content of the serum, varies greatly in different individuals. In a few cases it has been found difficult to immunize sufficiently with diphtheria toxoid to produce a Schick-negative reaction, and Schick himself said he believes that "there are some individuals who are totally incapable of developing antibodies against diphtheria." Fortunately such instances must be very rare.

Tetanus Alum-toxoid

Glenny (1930) investigated the immunizing effect of tetanus alum-toxoid on guinea-pigs and horses, using the precipitate formed after the addition of alum to tetanus toxoid. He found that in the hyperimmunization of horses "the addition of alum to tetanus toxoid doubled the value of the antitoxin produced . . . and if horses were *rested for a month or more after a primary stimulus* before immunization was continued much stronger antitoxin was produced." This principle is adopted by Dr. G. F. Petrie in the immunization of horses at Elstree. An injection of alum-toxoid is given on admission to the stables, a second injection two or three months later, and then the injections are repeated every six months.

D. H. Bergey (1934) also found that alum-toxoid gave better results than untreated toxoid. When 1 c.cm. was injected into a guinea-pig the animal's serum contained 1 unit of antitoxin per c.cm. after ninety days, when a second injection was given; fifteen days later the content of the serum rose to 9 units per c.cm. Bergey used the same preparation of alum-toxoid to immunize thirty-five adult persons whose serum before immunization contained on an average 0.0001 unit of antitoxin per c.cm. Ninety days after the first inoculation the titre had risen to between 0.001 and 0.04 unit per c.cm., but a second injection 125 days later raised the antitoxin content to from 0.1 to 9 units per c.cm.—an increase of from one thousand to nine thousand times the original amount.

Alum-toxoid was prepared by adding alum (1 per cent. or rather less) to the toxoid solution. The resulting precipitate before being used for inoculation was thoroughly washed to remove any traces of alum or protein from the culture medium in order to avoid skin reactions. None of the inoculated persons complained of local or general reactions.

Conclusion

There seems to be no doubt that by the injection of toxoid or of alum-toxoid, which seems to give even better results, it is possible to confer complete and permanent immunity on the vast majority of those inoculated. The immunity thus produced depends not only upon the presence of antitoxin in their blood but to a still greater extent upon the "sensitization" of the reticulo-endothelial cells to tetanus toxin, and results in a much greater and more active response to the antigenic stimulus, so that infection by tetanus bacilli at any later date will be countered by a rapid and increased output of antitoxin sufficient to afford complete protection.

Such protection might be afforded to the British Army by the injection of two doses of alum-toxoid at an interval of three months, with the additional protection of a third inoculation before being called upon for foreign service or in the event of war. This last inoculation might be combined with anti-typhoid immunization, since it was found by Ramon and Zoeller (1927) that the efficacy of tetanus toxoid in immunization was actually increased if a bacterial vaccine such as T.A.B. was injected at the same time.

The papers referred to in this note are a few only from many that have been written on this subject in recent years.

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A. Weissmann (*Wien. klin. Wschr.*, December 18, 1936, p. 1556) draws attention to the value of hyperthermia in the treatment of myalgia, neuralgia, neuritis, chronic arthritis, neurosyphilis, etc. This is supposed to be due to increase of resistance on the part of the organism, which results in hastening the process of repair. The author has produced hyperthermia therapeutically for the past six years by using a modification of Walinski's pack. The patient is given a bath at 37° C., wrapped in a flannel and six woollen blankets, and left for six to eight hours. Physical and chemical treatment—namely, injection of proteins—combined allow of smaller quantities of the latter to be used. Fever is induced every second day, and in most cases a course of twelve packs suffices. The injection of 10 c.cm. of 20 per cent. salt solution for the prevention of sweating, according to Walinski's original method, is stated by Weissmann to be unnecessary. Hyperthermia should never be produced in tuberculous cases or in those with cardiovascular disease. The author also recommends a pack used by Abrahamowicz, which is milder than Walinski's and more pleasant for the patient. Different varieties of herbs exposed to *x* rays and ultra-violet light are put into thirty little sacks and heated to 45° C.; fifteen sacks are placed below and fifteen on top of the patient, who is wrapped in a rubber and woollen blanket. In three-quarters of an hour the temperature may reach 39° C. The pharmacological action of the herbs and the setting free of vitamins through radio-activity as declared by Abrahamowicz are denied by Weissmann.

DEATH FOLLOWING BLOOD TRANSFUSION

NOTES ON TWO CASES

BY

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Dr. N. S. Plummer (1936) has recently drawn the attention of the profession to the danger to life which may occasionally result from the transfusion of a patient with compatible blood. To the five cases he has reported I should like to add two more which have occurred within my own experience.

Case I

This was a case of aplastic anaemia in which death followed within five minutes of a third transfusion. The patient was a male, aged 42 years, admitted to hospital complaining of increasing pallor and dyspnoea on exertion for one month. There was a past history of syphilis eighteen years before, but the Wassermann had become negative after treatment over a period of two years.

His nutrition was good, though he was extremely pale and anaemic. There was no oedema of the ankles. He gave no history of loss of blood from any source. There was no enlargement of liver, spleen, or lymph glands. His pulse was regular and forcible. His heart was not enlarged clinically, and the sounds were regular and of good quality. His blood pressure was 175/95 mm. Hg. His urine contained no excess of urobilin; his icterus index was 5 and his blood Wassermann negative; his blood urea was 30 mg. per 100 c.cm. Examination of the blood on the first day of admission to hospital showed: red blood corpuscles, 1,400,000; haemoglobin, 20 per cent.; colour index, 0.7; white blood corpuscles 5,000 per c.mm. A differential count revealed: polymorphonuclear leucocytes, 18 per cent.; small lymphocytes, 80 per cent.; large lymphocytes, 2 per cent. The blood group was II (Moss), the bleeding time half an hour, and the coagulation time five minutes.

He was given 90 grains of ferri et ammon. cit. daily. As he showed no signs of improvement 550 c.cm. of Group II blood was administered by direct transfusion (Joubet method) on the seventh day after admission. No sequelae resulted. The day after the transfusion the blood count was: red blood corpuscles, 1,300,000; haemoglobin, 20 per cent.; colour index, 0.7; white blood corpuscles, 6,000 per c.mm.

On the tenth day there was a further direct transfusion of 550 c.cm. of Group II blood; again no sequelae resulted. On the thirteenth day a blood count showed: red blood corpuscles, 860,000; haemoglobin, 12 per cent.; colour index, 0.7; size of red cells, 8.2 μ; white blood corpuscles, 4,000 per c.mm.; polymorphs, 27 per cent.; small lymphocytes, 69 per cent.; large lymphocytes, 4 per cent. Haemorrhages were now to be seen in both fundi and round the margins of the lips. His blood icterus index was 3.

The third and fatal transfusion was on the fourteenth day after admission. It is important to mention that in spite of his low haemoglobin he was quite able to sit up in bed without assistance immediately before the transfusion was begun. As on the two previous occasions the direct method was used. After about 150 c.cm. of blood had been transfused he became increasingly restless. This restlessness had been observed on the two previous occasions at about the same stage of the operation, but had passed off after a pause had been made. The operation was accordingly suspended for a minute or so, and then, encouraged by a slight improvement in the patient's condition, a further 50 c.cm. of blood was introduced, making a total of 200 c.cm.

His condition was now alarming; respirations were becoming rapidly intermittent, his pupils were starting to dilate, the pulse was absent at the wrist, and the heart sounds were faint. Intracardiac stimulants (adrenaline and strychnine) were of no avail, and death occurred within five minutes of the end of the operation.

Each transfusion was from a different donor, who was carefully grouped and whose blood was directly tested with that of the patient before each transfusion was started. Post-mortem examination showed no abnormal changes in the lungs. The heart muscle was pale but otherwise normal, and there was no clot in either branch of the pulmonary artery. The spleen was normal in size. The kidneys were large (right 8 oz., left 11 oz.), and showed a mixture of chronic interstitial nephritis and toxic changes; microscopically there was extensive tubular damage and fibroid glomeruli.

Case II

This was a case of pernicious anaemia in which death followed five hours after the first transfusion. The patient was a male aged 50 years. He was a typical case of pernicious anaemia, with early subacute combined degeneration of the spinal cord. He gave a history of increasing breathlessness on effort, tingling and numbness in the hands and feet, and loss of energy, but no loss of weight.

He was fairly well nourished, but anaemic, and his skin and conjunctivae had a subicteric tinge. His peripheral arteries were moderately sclerotic and his heart sounds were regular, but of only fair quality. His blood pressure was 125/75 mm. Hg. Examination of the chest revealed a mild generalized bronchitis. The only abnormalities found in the central nervous system were slight nystagmus, absent abdominal jerks, bilateral extensor plantar responses, and absent vibration sense in both legs.

His urine contained a trace of albumin, but no excess of urobilin. No occult blood was found in the faeces. A fractional test meal showed a complete achlorhydria, with no delay in emptying of the stomach. His blood Wassermann was negative, Group IV (Moss), and his blood count was: red blood corpuscles, 1,250,000; haemoglobin, 25 per cent.; colour index, 1; average size of corpuscle, 8 μ; white blood corpuscles, 2,500 per c.mm. A differential count showed: polymorphs, 54 per cent.; small lymphocytes, 42 per cent.; large lymphocytes, 4 per cent.; nucleated red cells present in fair numbers. A urea clearance test gave the following results:

Blood urea at the end of the first hour, 85 mg. per 100 c.cm.
Concentration, 2.1 per cent.
Clearance, 29 c.cm.

That is, there was evidence of very definite renal damage.

He was given 5 c.cm. of campolon daily intramuscularly. It was thought that perhaps his improvement might be hastened by a transfusion. Accordingly, on the fourth day after admission he was given 550 c.cm. of Group IV blood by the indirect (citrate) method. A transfusion service donor who had given blood on several previous occasions was used, and the patient's and donor's blood were perfectly compatible when mixed directly before the transfusion.

There was no immediate reaction of any kind, but one hour later the patient complained of feeling cold and had a rigor. He was given hot drinks, and he settled down again with no further complaints until four hours after the transfusion, when he suddenly collapsed and went into a coma, with cyanosis, dyspnoea, and a feeble pulse. His chest was then full of bubbling rales, and he died an hour later.

At necropsy the lungs were found to be oedematous. The heart was slightly dilated and its muscle was very flabby and showed a typical thrush breast appearance. There was a moderately severe degree of chronic interstitial nephritis. No other abnormalities were found, and no evidence of pulmonary embolism or clot formation in any of the larger vessels was demonstrated.

Classification

While these deaths following transfusion are not common, they are nevertheless disturbing. It would therefore be as well to consider in a general way the groups of conditions in which a transfusion may be thought a reasonable adjunct to other therapy, and at the same time to classify the fatalities in the same way.

The first big group of conditions for which blood transfusion is used universally is in the treatment of acute blood loss from any source. If reference is made to the fatalities it is clearly seen that not one of them falls into this group. Further, I think it is generally agreed that transfusion in these conditions is never followed by any reaction to which death could be directly attributed. Blood transfusion is employed so often in these cases, especially by the obstetrician, that had this not been so I feel sure that we should have found many more cases reported in the literature.

In another large group the object of the transfusion is not to replace actual blood loss, but to stimulate blood formation. The various anaemias, both primary and secondary, obviously fall into this group. Fatalities reported belonging to this group are (*a*) Plummer's Cases I to IV inclusive; (*b*) Carrington and Lee's case (1923); (*c*) both my cases.

A third group of conditions consists of those in which the object is to stimulate the body's reaction to infection or toxaemia, either acute or chronic. Case V in Dr. Plummer's series falls into this group.

Let us now consider the differences between the cases of the first large group and those of the second and third groups. In the first group we have a perfectly normal cardiovascular system deprived of blood. If we replace the blood lost the patient, other factors being equal, is in no worse state than he was before the onset of his haemorrhage. In the second and third groups we have a cardiovascular system which has been injured, to a greater or less degree, by a deficient oxygen supply over a long period or by toxaemia, or by both in conjunction; here the amount of humoral fluid is at least normal. To this system we add a strain in the shape of an increase in blood volume, and thus place an extra load upon an organ which is already relatively inefficient. Fortunately the cardiac reserve is large enough to meet the demand in most cases, and nothing happens; but in a few it is not, and even death may result.

Possible Methods of Prevention

How, then, may this strain be avoided? One practical suggestion is that before transfusion in these cases venesection should be performed, and only the same volume of blood transfused as has been removed. The only possible alternative is to resort to frequent small transfusions, which are often a nuisance to both patient and doctor, and are naturally of very much less therapeutic value.

In considering certain factors which are common to all three groups, anaphylaxis at once comes to mind. This might suggest that it plays perhaps a smaller part in producing a fatal issue than that which Dr. Plummer would accord it. May I add in conclusion that it is my experience of direct transfusion that by increasing the rate of transfusion, especially after about 150 c.cm. of blood has been given, it is possible to produce in almost any patient a fit of severe coughing, which rapidly ceases if the transfusion is stopped for a moment or two, and does not as a rule return even when the rate of transfusion is increased again. I think this may be ascribed to a temporary over-distension of the right auricle, and until the distension of the auricles is equalized via the pulmonary circulation a certain amount of hold-up on the right side of the heart results. Once the cardiac output has been increased the constant addition of blood does not produce any significant effect upon the action of a normal heart.

Towards the end of a moderately large direct transfusion it is quite common for the patient to complain of backache and to become somewhat restless; whether this is in some way connected with the accommodation of the added blood by the splanchnic circulation would be a difficult point to settle; it is certainly quite different in character from the early severe pain in the back associated with the transfusion of incompatible blood.

Summary

1. Two cases of death resulting directly from transfusion with compatible blood are reported.

2. The importance of recognizing the causes at work in producing possible fatalities is stressed.

3. The mechanical rather than the anaphylactoid element is regarded as being the more important in their causation.

4. It is suggested that a venesection might be performed before transfusion in certain cases.

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Clinical Memoranda

Gastric Perforation in a Tabetic

In "acute abdomens" pain is usually the presenting symptom, and its absence may have disastrous results. I have been urged to publish the following case on account of its rarity and interest.

Case Record

I was called a short time ago to see a man, aged 40, previously unknown to me, who complained of vomiting and diarrhoea. The onset had been acute the evening before, following a motor-cycle ride which had resulted in his becoming wet and thoroughly chilled. No article of diet could be incriminated, and there was no history of previous gastric trouble. When seen he was sitting up in bed, quite cheerful, not obviously very ill, and with no abdominal pain. His temperature was 99° F., pulse rate 84. The tongue was slightly furred, the abdomen tender, but not more so than one would have expected in a case of gastro-enteritis of this degree, nor was there more than slight rigidity. The vomitus and faeces had not been kept; the former had consisted at first of food, and later of "green bile"; the faeces were liquid and pale. He complained of pain, increasing in severity, across the back of his neck and shoulders.

I diagnosed gastro-enteritis, aggravated and possibly caused by the chilling, and fibrositis in the region of the trapezii from the same cause. I decided not to give a purgative, but prescribed a bismuth mixture and liniment. The next day his general condition and physical signs were about the same, except that the temperature was 102° F., the pulse rate 96. Vomiting had ceased, but the diarrhoea persisted. The pain in the neck and shoulders was worse. The day after that he appeared for the first time obviously ill. He was collapsed, blue, and sweating, with a temperature of 97° F. and pulse rate 120; there was still no abdominal pain, but the neck and shoulder pain persisted. I had him removed to the Buchanan Hospital, St. Leonards, where he was seen by Mr. J. A. Kerr, F.R.C.S., who confirmed the physical signs and advised continuation of medical treatment. The man's condition grew rapidly worse, however, and he died the following day.

Necropsy showed, to our astonishment, perforation of a large gastric ulcer on the lesser curvature of the stomach, with, of course, generalized peritonitis. In course of time the man's panel record card was forwarded to me. I then found out that (as I had tentatively suggested after the

necropsy) he had suffered from tabes dorsalis, having completed a course of treatment nine months before.

This case affords an interesting illustration of the separate phrenic nerve supply of the diaphragmatic peritoneum, while from the clinical aspect two points call for comment.

1. In the absence of abdominal pain and rigidity a tabetic (even when known to be such) runs a grave risk of misdiagnosis should an intra-abdominal disaster occur.

2. The condition of shock found in cases of perforated gastric ulcer would seem to be due in the early stage almost entirely to the pain, and only later to toxaemia.

St. Leonards-on-Sea. C. M. CARR, M.B., B.Chir.

Recurrent Idiopathic Herpes Zoster

A retired educationist, aged 66, came to see me on January 14 with the remains of an eruption of herpes zoster occupying the seventh dorsal segment on the right side.

CASE REPORT

The eruption had appeared about a fortnight previously and was preceded and attended by a considerable degree of pain. When seen by me there were a few excoriated areas left by blisters, the distribution of these being in three principal parts of the segment—the anterior, lateral, and posterior areas described by Head. The patient felt "ill" but was able to go about throughout the attack, and at the time of his visit all the symptoms were definitely diminishing, and the herpes zoster was clearly running a normal course.

No history of varicella or of herpes zoster in other persons in his family was obtainable, either before or after the attack was noticed. The patient is a remarkably healthy man and at no time in his life has he had arsenical treatment.

Upon stripping the patient it was at once obvious that there had been a previous eruption of herpes zoster occupying the seventh left dorsal segment—that is to say, at precisely the same level as the present attack, but on the opposite side of the body. The scars left by the previous eruption indicated a much more severe attack than the present one, and their distribution again obtained a maximal measure in the three areas—anterior, lateral, and posterior. The character and distribution of the scars left no possible doubt as to their causation, and the patient stated that he had had a very severe attack of the same nature as the present, only much more painful and prolonged, in the spring of 1915. He further volunteered the interesting information that his mother, on the occasion of the attack in 1915, assured him that he had had a similar attack at the age of 4 years, but the patient could not give any further information as to the position of this earlier eruption, nor were there any scars to indicate its distribution.

COMMENTARY

In recording instances of recurrence as idiopathic herpes zoster the most meticulous care must be taken to avoid: (1) confusion of the eruption with herpes simplex, a common mistake; (2) confusion with traumatic herpes; and (3) confusion with arsenical herpes. By idiopathic herpes zoster I mean the condition described by Head in his classical paper (*Brain*, 1900) as "an acute specific disease of the nervous system," which indeed he compared with what he called the "exactly analogous disease," acute anterior poliomyelitis. He wrote:

"Some agent of the nature of which we are ignorant chooses the substance of the posterior root ganglion for its selective activity, producing profound inflammatory changes. These destructive changes in the ganglion produce irritation of its nerve elements, and to this irritation is due the eruption on the skin."

Head differentiated this primary type from others in the following terms:

"It is interesting to find that acute inflammation of a posterior root ganglion, due to its implication in some local inflammatory process, can apparently produce an herpetic eruption indistinguishable from an eruption which arises as manifestation of the acute specific disease."

In this category are to be placed the cases resulting from the use of arsenical preparations producing a type of eruption indistinguishable from idiopathic herpes zoster, but clearly to be differentiated from it. Herpes of this causation is not infrequently recurrent.

It is important to avoid acceptance of any but the most positive evidence of the previous attack, evidence such as is afforded by the presence of the characteristic distribution of scars being much more convincing than any statement made by the patient. When a proper measure of care in investigation is taken a recurrent idiopathic herpes zoster is found to be extremely rare, and therefore I record this case. In a long experience I can recall only one other personal observation, which occurred in a medical man whom I saw with an active eruption of idiopathic herpes zoster at the age of 50; I was able to identify scars of a previous attack upon the other side of the body, and not at the same level, which the patient dated as having occurred when he was 10 years of age. I have met with no record of a recurrent attack at the same level upon the opposite side of the body, but simultaneous bilateral eruptions at the same segmental level have been noted. They have been observed chiefly in association with severe injury or disease involving the whole thickness of the spinal cord, and consequently such cases have been generally fatal, thus confirming the widely entertained popular belief that "shingles which meets round the body portends death." Cases of non-fatal traumatic herpes may show frequent recurrence as in the following instance. A friend and colleague of mine while an undergraduate at Cambridge fractured one of the upper cervical vertebrae; after a long illness he recovered completely from the injury, but from time to time throughout his life he was subject to herpetic eruptions, attributable to recurrent inflammations, accompanied by pain, at the site of injury.

London, W.1. E. GRAHAM-LITTLE.

Paralysis of Accommodation as the Result of Internal Administration of Stramonium

The following note of a case may prove interesting to general practitioners as well as to ophthalmic surgeons. Tincture of stramonium contains small amounts of atropine and hyoscine.

A girl aged 13, an in-patient at University College Hospital with asthma and bronchitis, was referred to the ophthalmic department on October 29, 1936, complaining of difficulty with reading. The pupils were moderately large, and their reaction to direct light not very brisk. New glasses had been provided from an outside source in July, 1936. The right vision with glass was 6/9, left vision with glass 6/9. With glasses she was able to read small print at eighteen inches but not at fourteen inches distance.

On inquiry it was found that this patient had been taking a mixture containing potassium iodide 4 grains, tinct. stramonii 20 minims, spt. lobeliae aeth. 10 minims, syrup of tolu, and aq. chlorof., three times daily from October 17—that is for a period of twelve days.

On November 2 she was able to read Jaeger 6 with much difficulty at twenty-four inches, and not nearer, with her glasses. The distance vision was as before, and no additional plus or minus sphere was accepted by either eye. On November 9 the pupils were smaller and she could read with either eye, with her glasses, Jaeger 1, at as short a distance as five inches—after having been without the medicine for three days.

London, W. HUMPHREY NEAME, F.R.C.S.

Reviews

THE EXTRA PHARMACOPOEIA

Martindale's Extra Pharmacopoeia. Vol. 1. Twenty-first edition. In two volumes. (Pp. 1,182. 27s. 6d.) London: The Pharmaceutical Press. 1936.

Martindale's *Extra Pharmacopoeia* is so well known to the medical profession that it is unnecessary to give any account of its general scope and purpose. The twenty-first edition of the first volume is, however, of special interest because it is the first edition of this part of the work to appear under the management of the Pharmaceutical Society. The first *Extra Pharmacopoeia* was produced in 1883 by William Martindale and W. Wynn Westcott; these editors died in 1902 and 1925 respectively, and W. H. Martindale, the son of the former, carried on the self-imposed duty until his death in 1933, not long after the appearance of the twentieth edition of the first volume in 1932. The task of editing the volume had become more than any one man could manage, but fortunately for the medical profession the continuance of this invaluable work of reference was undertaken by the Pharmaceutical Society, who appointed a revision committee with Mr. C. E. Corfield as editor. This committee brought out the twentieth edition of the second volume in 1935, and has now produced the twenty-first edition of the first volume.

When the *Extra Pharmacopoeia* made its bow in 1883 synthetic drugs were just beginning to invade therapeutics in substantial numbers, but ever since that date their numbers have increased by geometrical progression; furthermore the appearance of endocrine and vitamin preparations has helped in swelling the number of substances available for therapeutic use. As a result the task of the editors has changed completely: half a century ago the essential point was to give an adequate account of all drugs likely to be used by doctors, whilst to-day the problem is how to compress into a pocket volume a reasonable proportion of the material available. Perhaps the most significant fact about the present edition is that the editors have succeeded in effecting a small reduction in the number of pages. In view of the quantity of new drugs and preparations that have emerged in the last five years this is a notable achievement. The preface states that the whole of the material has been examined exhaustively with the object of removing matter of little or no value, and perusal of the volume shows that a drastic revision has in fact been made. The subject-matter has been largely rearranged and reclassified, and one useful change is the abolition of the supplementary list of drugs, which had shown a tendency to degenerate into something like a rubbish heap. We note also that a thorough weeding of the references has been effected.

The essential feature of a volume of this kind is that it should give an up-to-date and impartial account of the properties of important new drugs. Examination of the text shows that it contains good accounts of all important new drugs even when these have only appeared during the past year. For example, more than a page is devoted both to protamine insulinate and to prontosil. Examples of other advances made in the last five years which are described are mandelic acid, atebrin musonate, ergometrine, evipan, and a number of new hormones and vitamin preparations.

There can be no doubt that the *Extra Pharmacopoeia* is becoming of more and more importance to the medical profession. The rate of progress in therapeutics has quickened greatly in recent years and hence information about recent preparations is more necessary. At the same time the mere number of new preparations and still more the number of new proprietary names makes some encyclopaedic work of reference essential. The impartiality of the *Extra Pharmacopoeia* is also an important feature. There is no need to enlarge on the peculiar difficulties which commercial enterprise in the sale of drugs presents to the medical profession. Every doctor is deluged with a flood of advertisements by post, which range from accounts of important new therapeutic advances to endeavours to promote the sale of worthless rubbish. No practising doctor has the time to hunt through the polygot original literature, which indeed varies in quality almost as widely as do the advertisements. The *Extra Pharmacopoeia* provides an exhaustive and unbiased account of the status of these preparations, and for this reason will be found invaluable by the medical profession.

CLINICAL ENDOCRINOLOGY

Endocrinology in Modern Practice. By William Wolf, M.D., M.S., Ph.D. (Pp. 1,018; 235 figures. 42s. net.) Philadelphia and London: W. B. Saunders Company. 1936.

So many books have appeared of recent years on the subject of endocrinology that the practitioner would naturally wish to know what are the special features of Dr. William Wolf's *Endocrinology in Modern Practice.* We would select two. The first is the careful tabular summaries at the end of each section, from which the reader can quickly gather the physiology and pathology characteristic of each endocrine gland, and can then refer back to the more detailed account of the particular point in which he is interested. The second is perhaps more individual: about 180 pages are devoted to the endocrine aspects of "non-endocrine" diseases, which should be a valuable guide to determining whether the condition with which the practitioner is faced is primarily due to a disorder of the endocrine system or whether it is merely incidental to a more general disease. In these days of specialism this should serve as a useful corrective to an uncritical tendency to force the clinical picture to conform to preconceived ideas.

The section on diagnosis is constructed on a practical plan, with a suggested order of examination and an interpretation of the value of laboratory findings. We would specially call attention to the chapter on bone development. Not many of us can carry in our memories the dates of the appearance of centres of ossification or of epiphyseal junctions. The series of skiagrams illustrating such facts form a valuable picture gallery for ready reference. Delay or undue acceleration in these processes can thus be easily detected.

There are a few points of detail which call for emendation in any subsequent edition. The association of the pituitary sex hormone with the basophil cells is by no means so generally accepted as one would gather from this book, and we failed to find any reference to Crookes's work on the hyaline change in these cells, which occurs whatever other endocrine structure is involved in Cushing's syndrome. It is not clear whether the author regards gastrin as an independent substance or merely identical with histamine, as is now generally thought. Antihormones are not the same thing as chalones. Sharpey-Schafer introduced the latter term for a hormone which exerted a relaxing or inhibitory action. Thus adrenaline is a hormone to the plain muscle of the blood vessels but a chalone to the plain muscle of the intestine. This is not

the sense in which Collip uses the term antihormone, which, like other antibodies, he regards as produced in answer to the administration of a hormone. It is difficult to see why the organism should produce an antibody to one of its own products, and it would appear to limit the usefulness of organotherapy. But a discussion of the theory of hormone-antihormone balance would lead us too far afield.

ORGANIC CHEMISTRY

Recent Advances in Organic Chemistry. By Alfred W. Stewart, D.Sc. Vol. II. With the addition of Part II, by Hugh Graham, D.Sc. Sixth edition. (Pp. 519. 21s.) London: Longmans, Green and Co. 1936.
Reactions of Organic Compounds. By Wilfred John Hickinbottom, D.Sc., Ph.D., F.I.C. (Pp. 449. 16s.) London: Longmans, Green and Co. 1936.
Organic Chemistry for Medical Students. By George Barger, D.Sc., LL.D., F.R.S., M.D.(Hon.). Second edition. (Pp. 251. 10s. 6d.) London: Gurney and Jackson. 1936.

The second volume of a new edition of Stewart's *Recent Advances in Organic Chemistry* is now before us. The speed with which organic chemistry has advanced in its contact with physiology, pathology, and therapeutics has been so rapid in immediately recent times that a very large number of important substances are now well known as to their molecular constitution which but lately were known only by association with their origins or uses. Among these may be mentioned the vitamins, the hormones, certain glycosides which exert an influence on the action of the heart, the sterols, and the bile acids. The molecular configuration of many of these is now well established, and calls for the attention of all who study the relation of physiological activity to chemical structure. It is true that molecular structure does not teach all that could be desired. A chapter of the book is printed under the title "Structural Formulae and their Failings," but at the present stage of learning this is all that is to be had. The new edition contains a supplementary section, written by Dr. Graham, describing the most recently completed establishments of chemical constitution in the groups mentioned above. The book deals comprehensively with the advances in all other fields of organic chemistry and, besides describing the knowledge established, it gives a readable account of the procedure followed and of the methods used in the attainment of the knowledge. The description is accompanied by a discussion of the theories which are either accepted or are tentatively proposed regarding the questions and problems encountered. A special chapter of considerable interest deals with theories of the natural synthesis of vital products.

Hickinbottom's *Reactions of Organic Compounds* furnishes a general treatment of the subject of organic chemistry, but the treatment is approached from a different side from the ordinary. In this book the author's aim has been to give direct assistance to the laboratory worker in problems arising out of analysis as well as synthesis. Whereas in the realm of inorganic chemistry this aspect of instruction has from early times been put foremost, it has been largely otherwise in the organic field. The cause is no doubt due to the different conditions inherent in the two branches of chemistry and to the difficulties attending any scheme of treatment of organic chemistry which should be comparable with that applied to inorganic. All the more credit is therefore owed to Dr. Hickinbottom for breaking ground in this direction. He has chosen for description on the synthetical side the more exemplary cases gathered from researches in the production of many of the more complex compounds of typical character, including the classical methods which are generally well known and used for substances of simpler constitution. He has dealt informatively with the conditions necessary to avoid interference from secondary reactions, and wherever these take a form amenable to control he shows how they may be directed to the accomplishment of another purpose. The recognition of organic compounds is treated in an appendix, which provides a scheme for distinguishing identities by the observation of physical properties and by their behaviour in response to a series of general tests which are specific regarding type of constitution.

Professor Barger's *Organic Chemistry*, written especially for medical students, was noticed on its first appearance in our issue of June 10, 1932. This is a book well suited to the purpose for which it is intended, and we are not surprised that a second edition is called for. The opportunity has been taken of making a number of minor alterations and additions, and several of the diagrams have been redrawn. The last pages have been rewritten to indicate the enormous advances made recently by organic chemistry in the fields of vitamins and hormones.

THE FIELD OF THERAPEUTICS

Traité de Thérapeutique Clinique. Three volumes. By Paul Savy. (Pp. 2,716. Brochés, 300 fr.; cartonnés toile, 360 fr.) Paris: Masson et Cie. 1936.

A treatise in three volumes, extending to nearly three thousand pages, professing to cover the entire field of therapeutics, and written by one and the same pen, may not unreasonably be described as an event. Such is a general description of Professor Paul Savy's book. Its details are obviously beyond a reviewer's space, but a fairly full consultation of its pages justifies the conclusion that nothing is wanting for anyone who desires to make the subject of therapeutics a matter of earnest and sustained study. The book is not a compilation of the views and proposals of various writers; neither has it the properties of a ready-reference dictionary. On the contrary, it rests upon the author's personal clinical experience, and reflects his considered advice and judgement as these have been formulated and presented under the responsibility of many years of bedside teaching. Hence, while the argument is systematic and organized it is alive with the note of personal observation and conviction, and it has the appeal and attraction both of an effective exposition and of literary charm. The book is emphatically one to be read rather than regarded as a timely refuge in a difficulty or an emergency, and anyone who treats it in this fashion will not be without his reward.

Professor Savy applies the term "therapeutics" in the widest and most comprehensive sense; even surgical proposals and their respective merits are included in his pages, and he will not allow that these are entirely a question for his surgical colleagues. In part, therapeutics means the construction of formulas or prescriptions, and these take a due position in the teaching of the several chapters; among their virtues may be mentioned simplicity, directness, and removal from the cultivation of polypharmacy; and they are reasoned rather than imposed. Altogether Professor Savy's volumes are both an inspiring achievement and a substantial gift to the application of the art of medicine over a wide field. Those who read the introduction, entitled "Le Scepticisme en Thérapeutique," will hardly resist the chapters which follow.

HILAR CHANGES IN "EARLY" TUBERCULOSIS

Röntgenatlas Frühtuberkulöser Veränderungen im Hilus. By Dr. R. Czarnecki. (Pp. 98; 308 figures. RM. 24.) Leipzig: G. Thieme. 1936.

In current practice lateral skiagrams of the chest are as a rule only taken in occasional cases, in order to localize tumours of the mediastinum and oesophagus or foreign bodies and to determine alterations in the shape of the heart and vessels. Czarnecki of Leipzig has produced an atlas that should do much towards showing the possibilities of this radiological technique in connexion with tuberculosis and, particularly, in elucidating the problem of the development of the "early" lung lesion in the adult. The book is mainly concerned with Ranke's first and second stages of tuberculosis, and the author maintains that his work, which has embraced the systematic examination of the hila by lateral radiography of every patient under his care since 1928, lends good support to Ranke's conception of the disease.

Dr. Czarnecki has used throughout a standard technique, which he describes; and the volume comprises beautifully reproduced skiagrams, some of which represent serial photographs of the same patients over a period of several years. The clinician will be specially interested in the hilar changes (many of which are detected only by lateral radiography) associated with obscure mild constitutional symptoms, which are explained by the generalization in Ranke's second stage. It must be admitted, however, that a good deal of experience will probably have to be acquired by the reader before he is able to interpret the finer shadows in the lateral skiagrams with the surety of Dr. Czarnecki, who himself insists that the whole clinical picture and laboratory aids must be taken into account in arriving at a diagnosis.

Notes on Books

In his *Prelude to Chemistry* (G. Bell and Sons, 12s. 6d.) Dr. JOHN READ, F.R.S., has conceived the idea of carrying the reader back to the environment of the experimenters of the Middle Ages and beyond and of capturing the spirit in which things were then viewed. In the aspect thus presented alchemy was esteemed to be one of the humanities and the experimental researches of those days were prompted by a genuine desire for a knowledge of the truth, and not, as is sometimes thought, the outcome of a morbid desire for the discovery of treasure or the means of practising imposture. Adopting this outlook Read has shown how the old philosophers held their chemistry in much the same esteem as other branches of learning and the cultivated arts. The author has made extensive historical researches, which include a number of new observations, and has produced a very useful and readable history. Its value is greatly enhanced by the inclusion of upwards of a hundred excellent illustrations copied from ancient prints.

The transactions of the seventh Scandinavian Medical Congress, which was held at Copenhagen from June 27 to 29, 1935, have recently been published in the form of a large supplement to *Acta Medica Scandinavica*. Of 101 papers contained in the volume sixty-seven are in English, twenty-four in German, and ten in French. The principal subjects discussed are: functional tests of the heart; electrocardiography; various aspects of haematology; diabetes mellitus; gastro-intestinal diseases; and respiratory affections, including a paper by Jacobaeus on the surgical treatment of intrathoracic tumours. The volume is published at Copenhagen by the Imprimerie Royale Bagge.

The third volume of the forty-sixth series of *International Clinics* (Lippincott, 4 vols. quarterly, 50s.) consists of four unequal parts devoted respectively to surgery, medicine, a neurological and pathological conference on a case of carcinoma of the nasopharynx, and recent progress in ophthalmology and oto-rhino-laryngology. The surgical section contains four papers dealing respectively with malignant melanoma, pilonidal sinus (congenital cyst and sinus in the sacro-coccygeal region), and lithopaedion, of which about 177 cases have been recorded between 1582 and 1926. Of the ten papers in the medical section attention may be drawn to those on the differential diagnosis between Hodgkin's disease, lymphosarcoma and aleukaemic lymphadenosis, the diagnosis and treatment of disorders of micturition in diseases of the nervous system, undulant fever, spontaneous hypoglycaemia, and the nature and treatment of non-organic chronic fatigue in the child. A paper on experimental and clinical studies on staphylococcus toxin and antitoxin represents the contribution to ophthalmology, and another on suppuration of the petrous pyramid deals with the symptoms and diagnosis of this condition.

Preparations and Appliances

A POLARIZING OPHTHALMOSCOPE

Mr. J. D. M. CARDELL, F.R.C.S., writes:

Nearly everyone has experienced the annoyance caused by the corneal reflection of the ophthalmoscope lamp obscuring a part of the fundus which one particularly wants to see. This is still more the case when the pupil is small, either by reason of past iritis or from the use of eserine in a case of glaucoma. Nor is it advisable in the case of many elderly patients to dilate a pupil which is naturally small. These considerations, and the demonstration by Mr. Rugg-Gunn in 1926 of his polarizing retinoscope used in the refraction of cases with scarred corneae, resulted in the evolution of a polarizing ophthalmoscope and the satisfactory removal of the annoyance. In this I was greatly assisted by the advice of Mr. Keeler.

After the instrument had been completed, and described at the annual congress of the Ophthalmological Society of the United Kingdom in 1935, I learned that an instrument had been made in 1920 to achieve the same purpose. I believe there are not more than one or two such instruments in the country. It is a somewhat large piece of apparatus, unsuitable for everyday use, by means of which the fundus can be viewed by the indirect method. It lacks the mobility of the instrument to be described, which is used in the same way as an ordinary self-luminous ophthalmoscope, and which gives a direct, non-inverted view of the fundus with the usual magnification obtained by that method.

Polarized light was discovered in 1669 by Bartholinus, who investigated the optical properties of doubly refracting Iceland spar or calcite. This crystal shows its power of double refraction when placed over a dot marked on a sheet of paper. When viewed from a position vertically over the position of the dot, two dots are seen instead of one; one corresponds with the position of the dot on the paper, and the other is displaced to an amount proportional to the thickness of the crystal (Fig. 1). On rotating the crystal, still keeping it in contact with the paper, the first dot remains stationary, and the displaced image rotates round it.

This phenomenon was further elucidated in 1690 by Huygens, who showed that light passing through calcite was divided into two distinct rays of equal intensity. One passed through without refraction and was called the "ordinary" ray; the other, the "extraordinary" ray, was deflected, but emerged parallel with the first. In 1810 Malus found similar peculiarities in the light reflected at particular angles from glass or water. The locus of a particle of light is perhaps best illustrated by the figure produced by pulling apart the ends of a wire which has been bent into gentle curves in all

directions. Thus, although the path is not a spiral one, it can be resolved into two linear components at right angles to each other, and proceeding in the line of propagation of the light.

Light may be polarized in a plane, circular, or elliptical manner. It is with plane polarized light that we are concerned here. As already indicated, plane-polarized light is obtained when light is passed through Iceland spar, the rays being divided into "ordinary" and "extraordinary." For practical use the ordinary ray must be eliminated. This is done by a Nicol prism, which stops the passage of the ordinary ray by total reflection within itself. This prism is made by working the calcite in a special relation to its optical axis,

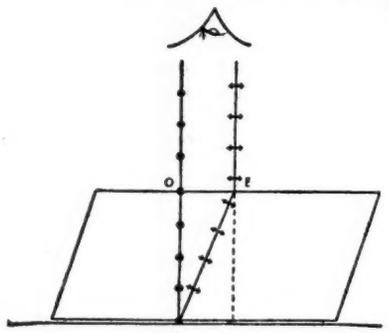

FIG. 1.

cutting the piece so obtained obliquely in two, and cementing the two halves with Canada balsam, which has an index of refraction lying between the indices of the calcite for the ordinary and extraordinary rays. The ordinary ray, reaching the balsam at an angle greater than the critical angle, is totally reflected by it and absorbed by the black coating on the outside of the Nicol prism. The extraordinary ray suffers no such reflection, and therefore emerges from the prism as a beam of plane polarized light (Fig. 2).

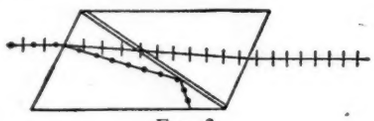

FIG. 2.

The direction of polarization, or vibration, of the beam is parallel to the short diagonal of the prism—that is, perpendicular to the balsam film. Viewed by the naked eye, the light emerging from the prism does not differ appreciably from ordinary light, except that there is a reduction in intensity. If, however, a second Nicol prism is placed in front of the observer's eye and rotated, the beam from the first prism will become fainter and finally disappear. This happens when the short diagonal of the second prism is at right angles to the plane of polarization. The second prism may thus be made to transmit or stop the extraordinary ray from the first prism (Fig. 3)

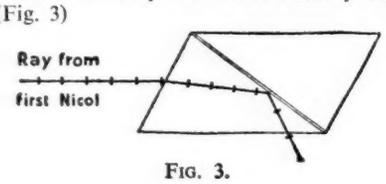

FIG. 3.

Description of Ophthalmoscope

In the ophthalmoscope made for me, after a great many experiments by Mr. Keeler, these principles are employed. Rays of light from a powerful source in the handle are rendered convergent by a condensing system. They then traverse a Nicol prism and come to an approximate focus on a battery of thin glass plates in contact with each other. The plates are set at an angle of 45 degrees to the long axis of the instrument. A second Nicol prism in the eye-piece can be rotated around the line of sight of the observer and be fixed in any position. The adjustment of this prism is made by the optician. Plane polarized light from the first prism is reflected unchanged by the glass plates in the direction of the pupil. Some of the light is reflected by the cornea, still plane-polarized.

The light passing into the interior of the eye is reflected by the fundus, and emerges from the eye again as depolarized light. Thus the reflection from the cornea differs from that from the fundus in that the former is plane-polarized. By rotating the Nicol prism in the eye-piece into the appropriate position the reflection from the cornea is totally eliminated. Of the light reflected from the fundus only part is eliminated by the prism in the eye-piece, the fundus being seen by the remainder. The details of the fundus are, of course, unchanged morphologically, but the appearance differs slightly from that obtained by an ordinary ophthalmoscope in that the glare from the internal limiting membrane and from the vessels is reduced. This is a decided advantage.

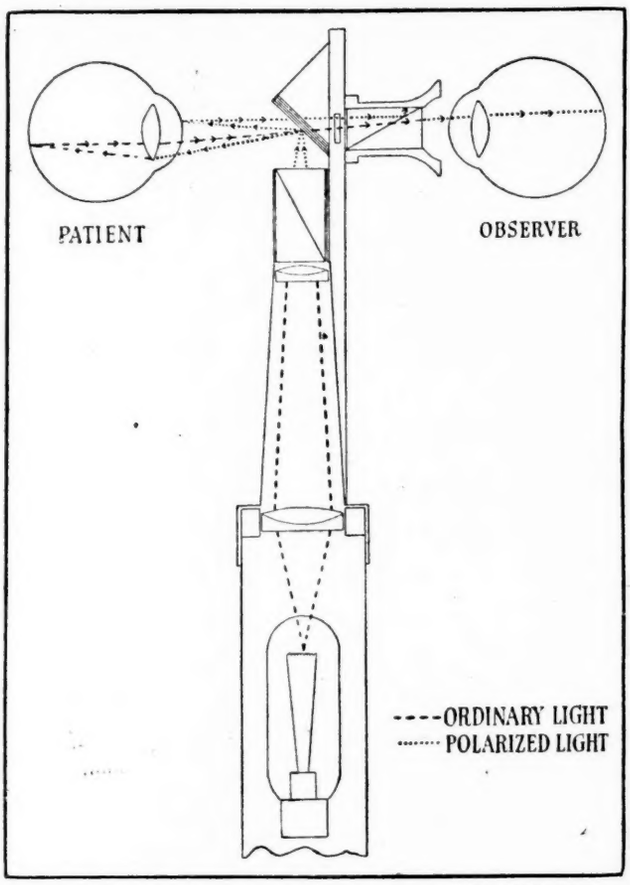

FIG. 4. (Taken from *Trans. Ophth. Soc. U.K.*, 1935, **55**.)

The improvement over ordinary ophthalmoscopes, self-luminous and non-luminous, is obvious. It is possible to obtain a view of the macula through a pupil contracted by eserine with the high magnification of the direct method. It has been found that the fundus picture is less obstructed by corneal and lenticular opacities than when using other methods. A truer estimate can be formed of what a patient with such opacities may be expected to see. The glare from the vascular coats being reduced, a diagnosis of hardening of the arteries is made less frequently, and in my view correctly so. The view of the macular region which can be obtained is excellent, and is only curtailed by the movements of the patient's eye. An attachment in the head of the ophthalmoscope allows the use of red-free polarized light, and the beam to be dimmed in intensity or to be narrowed to the size of the pupil to avoid glare from the iris.

The instrument will prove invaluable in teaching students who are beginning their study of ophthalmology. Whereas it used to take a certain amount of time and patience to get them to see small details, they can now, assuming average intelligence, appreciate a fundus picture at their first attempt.

PSYCHOLOGY IN INDUSTRY*

BY

MAY SMITH, M.A., D.Sc.

Investigator to the Industrial Health Research Board

Until the present century psychology had no place in industry, for to industrialists and economists alike it was only an academic discipline not even remotely connected with life. On the other hand, since psychologists had no direct experience of industrial conditions they ignored industrial problems. Occasionally a research worker thought that his research might have an industrial application, but there was no organic relationship between the industrial problems and psychological research.†

The industrial doctor is, however, not quite a "modern." As far back as the second century we read that Galen, before his appointment to the post of doctor to the Emperor Marcus Aurelius, was medical officer to the Roman school of gladiators—apparently they mattered. Armies in most ages have had their doctors.

The first recognition to my knowledge of industrial occupations studied seriously was when Ramazzini in the seventeenth century published a book on "the Diseases of Tradesmen." He was a professor of medicine at Modena, where it was the custom to clear out the cesspools every three years, and he was so struck with the miserable appearance of the workmen doing this that he got into conversation with them about their work; that led him to an interest in other occupations, the diseases peculiar to each, and the possible methods of treatment. He included in his list the diseases of learned men, "hoping that men of letters will not take it amiss to find themselves ranked in the class of tradesmen, considering that as they purchase to themselves by the pursuit of letters, if not great estates like those of the merchants, at least a livelihood and many comfortable conveniences. Secretaries to great men become melancholic owing to the strain of correcting their master's work and living in the uncertainty of how it would be received." Nearly two hundred years were to elapse before any further investigations were to take place. Ramazzini's book remained the standard textbook for over a century.

"The Human Machine"

Industrial development during the nineteenth century was governed by the claims of machinery rather than of man. The enormous development of machinery during the century, the studies made in the natural sciences, and the growing knowledge of the mechanism of the body all tended to focus interest on man's likeness to a machine. The phrase "the human machine," which rightly interpreted refers to part of his structure, became, rather by implication than design, synonymous with man himself. In so far as any attempt was made to study the worker of the machine the tendency was in the direction of showing the likeness of one worker to another and the likeness of all to machines.

The problem of munition work during the great war challenged the adequacy of this point of view. Industrial operations as conducted at the beginning of that period were implicitly based on an unjustified application of arithmetic. If 6 units of work could be done in one hour then 6×3 would be done in three hours, and 6×12 in twelve hours. The physiological necessity for sleep prevented the indefinite extension of the principle. The discrepancy between the expected and the observed facts led to inquiry, and, although it was not recognized then, that stage marked an epoch in the history both of psychology and of industry. The focus of interest changed from the machine to the worker of the machine. The failure of the twelve-hour day to produce twelve times as much output as one hour, and the high sickness absence, led to the formation in 1916 of the Health of Munition Workers Committee, and after the war, under the title of the Industrial Fatigue Research Board, a small department was formed to carry on investigations into the human aspects of industrial work. The problem of fatigue, which had exercised a curious fascination over psychologists for years, proved to be the connecting link between the older and the newer study, although in spite of the voluminous literature on the subject and the innumerable experiments there proved to be little of practical applicability. The earliest investigations were concerned with the relation of the worker to the material environment—length of the working day, the duration of rest pauses, the effect of lighting, heating, and ventilation.

These investigations, although concentrating on the worker, did so relatively objectively and enabled us to get some insight into the conditions that affect numbers in a group. Certain problems, however, proved to have little or no relation to environmental or physiological conditions, the known effects of which were in some cases masked by factors relating to the mental environment and to particular characteristics of the individual worker—for example, the effect of the temperamental make-up of the people in authority and of individual workers; incentives; the suitability of the worker for his work; the effect of age and outlook; monotony; liability to sickness and accidents. Again the focus of interest has been shifted, and there are indications that the problems of the immediate future lie rather with studies of individuals than with groups as such, and with the mental no less than with the physical and physiological aspects. This general change is well illustrated by the history of two particular problems: (*a*) industrial accidents, and (*b*) telegraphists' cramp.

Industrial Accidents

As is well known the introduction of machinery on a large scale into industry had as a serious consequence numerous accidents—fatal, disabling, and slight. Efforts have been made for many years by the Home Office to reduce these by guarding machinery, but it is recognized that "however well machinery is guarded we cannot look for more than a 10 per cent. reduction in the accident rate by the provision of safeguards alone."

Any person who considers accidents in ordinary life is likely to realize that some of the so-called accidents are not quite as accidental as they would appear. He will observe that having had one accident some people are liable to be so nervous that they have more, a view embodied in the popular belief that one accident involves the victim in three. On the other hand, one accident does make some people more careful. He will also have observed that there are people, generally called clumsy, who seem to attract accidents. When two statisticians, Professor Greenwood and Mr. Udny Yule, had the curiosity to test these rival views by studying the actual accidents that occurred in large groups of people over a considerable period of time history was made. They worked out what an accident curve would look like, assuming the truth in turn of each of the above views, and although in a particular case any one hypothesis might represent the conditions, yet the one that most nearly conformed to the facts for the group was the last one—namely, that there are people who have some idiosyncrasy predisposing to a relatively high accident rate.

We are then faced with two problems: What is this idiosyncrasy? Can we by some test or tests discover the "accident prone" at an early stage? Mr. Farmer and Mr. Chambers have been working on the second problem for years, and they can by tests select from a group those most liable to have accidents, but so far the tests would eliminate too many.

* Part of a paper read before the Industrial Medical Officers Association at the London School of Hygiene and Tropical Medicine, January 22, 1937.

† In studying the effects of loss of sleep I found that among these effects were uncontrolled motor adjustments, exhibited some time after the conscious effects of fatigue had passed away; the corollary was drawn that perhaps serious accidents in such work as railway signalling might be similarly motivated. This corollary may be true, but the only way to know the facts is to examine railway signalmen.

Telegraphist's Cramp

Telegraphists who have been trained to "send" telegrams by the Morse or Baudot systems are liable to a disability that prevents them from sending effectively. This disability may be of such a nature as to interfere with most muscular activities, or it may be limited to the sending of one particular sequence of dots and dashes. The most usual explanations were that the constant delicate movements made in "keying" had resulted in chronic muscular fatigue, the cure for which would have been rest, or that some organic disease of the nerves and muscles of the arms had been set up. Neither explanation proved to fit the facts, and a detailed study of the general environmental conditions failed to find any one that was the invariable antecedent of cramp.

Attention was next turned to an experimental study of the cramp group and a group of others not so affected, with regard to neuro-muscular ability. On *a priori* grounds one would expect that telegraphists suffering from cramp would be less efficient than the others at all tests involving speed and accuracy of hand movements. The tests, however, failed to differentiate the two groups adequately, some of those with cramp being quite as efficient as those without. The next stage of the investigation was to find out the differences, if any, in temperamental make-up. The results showed that over 75 per cent. of the cramp group had symptoms that would lead, quite apart from the cramp, to the diagnosis of an emotional disturbance known as psychoneurotic, or in more popular language, "nervous"; in the other group only 35 per cent. had such symptoms. Thus two investigations, conducted along different lines by different people, have certain unforeseen stages in common, leading from a study of the external and general conditions to the personal and particular. This latter investigation, involving as it did a study of nervousness, opened the way to the possibility of extending the method to other problems, of which some are:

1. What is the incidence of nervous symptoms in different groups?
2. Why in some groups does sickness absence from the so-called nervous disorders increase even in the presence of excellent material conditions?
3. In what conditions will the nervous person break down?
4. Why are some workers erratic, oscillating in output between extremes?
5. What is the effect of nervousness in people in authority and in subordinates?
6. What part is played by nervousness in industrial success and failure?
7. What are the factors, environmental and other, that protect the nervous person or determine breakdown?

Some of these have been attacked during recent years, some have been surveyed, and others cannot be attempted yet.

Vocational Guidance

Observation of individual workers shows that in particular posts some are more successful than others, whether we take an objective standard of efficiency—where such exists—or the subjective one of personal happiness. Hence there has arisen the study known as "vocational guidance," sometimes erroneously supposed to be the same as "vocational selection." The former sets out to select for a given person the work most suited to his capacities. Theoretically this presupposes a complete knowledge of the individual concerned, a knowledge of all possible occupations and their requirements, and an ability to relate the one to the other. In practice we never approximate to this ideal.

In vocational selection we assume that the physical and mental requirements for the work are known: we then select by appropriate tests from a number of applicants those most nearly coming up to the requirements. Many firms have developed a series of tests used by them in the selection of workers. For a large number of occupations, however, the requirements are not known. What, for example, apart from the technical ones, are the qualities that make for success as a doctor? It may be that there is some one outstanding quality which some day we may be able to isolate and test; it may be that success in the same environment may be achieved by people with very different qualities.

It is true to say that we can now, within a very narrow margin of error, test the intelligence of a child and express it in quantitative form. It is also known that certain occupations require a high degree of intelligence, whereas others do not. It is as futile to put a child of high intelligence to work needing little as to put a child of inferior intelligence to work needing a high degree. The one is wasteful, the other provokes unhappiness.

This problem, like so many others, is not of modern formulation, although it is one of modern application. At the beginning of the sixteenth century an English version of a Spanish book, *Examen de Ingenios*, by Huartes, was made under the title *The Examination of Men's Wits*. In it was made a plea for the recognition of differences of "wits," or, in modern language, intelligence, and it was suggested that in a well-ordered commonwealth men of great wisdom and knowledge should be appointed to discover each one's natural sharpness so that he might be set to learn what was most appropriate to it. Huartes also analysed the various professions from the point of view of the mental qualities required in them. He was much concerned that physicians of great learning often proved to be very bad practitioners, and he decided that theoretical medicine demands memory and understanding, but its practice imagination. Perhaps he was right.

Extravagant claims are put forward by some exponents of tests, claims which a critical scrutiny shows cannot be always substantiated, but this is not to say that they are useless. The alternatives are examination successes or a personal interview, neither of which is wholly satisfactory. Some people claim to be able to select the right person for a particular post by intuition: this seems to be all right so long as no one challenges the results. The use of tests is to give us more data on which to base a judgement, not to act as a measure to relieve us of the necessity for judgement. Ultimately in industrial selection as in the diagnosis of disease the diagnosis is an art.

Differences in Temperament

Suppose, though, that we do know the requirements for a particular activity—typing, for example—and that we have designed tests that are statistically sound and practicable to use, we have still only considered part of the problem. The actual movements or intellectual equipment that are necessary are only part of the whole. The activity has to be performed in particular circumstances and by an individual who has other characteristics in addition to those needed for typing. These circumstances and these characteristics are often of equal importance and sometimes of more importance. Let us assume that we have two typists equally efficient at typing dexterity and equally intelligent. Can we predict equal success in a given organization? One of them may be moody, resentful of criticism, irrationally antagonistic to any command, uncertain of herself, liable to worry at night over possible and even improbable mistakes: the other may be bright, reasonably careful, but able to dismiss from her mind work that can no longer be altered, easy with others, whether equals or superiors. It does not demand much knowledge to say that while the actual typing on a given occasion may be for practical purposes identical, yet the total result over a number of years will not be. The worrying over mistakes, in all probability not made, is likely to lead to real mistakes, and the chances of the first typist breaking down are more probable than those of the second. Nor will a bottle of tonic or an injunction not to worry be adequate to the situation.

These differences, unrelated to practical efficiency or intelligence, are what we call temperamental or emotional differences. It is often not realized how complex each moment of life may be as regards possibilities of experience. For example, X gives a command to A and to B, and he in all probability is only aware of what he wishes to have done. Rationally, too, A and B ought to consider it from that aspect and devise means for its execution. Reason is, however, rarely a decisive factor. That command, in addition, is given by X, and X's manner of commanding may infuriate A and leave B unmoved. The fringe of emotional possibilities surrounding the command is sometimes more real than the content of the command, and can be reflected in the way in which X's commands are received compared with Y's. Yet A and B may be unaware of the emotional reaction. These observations are matters of daily experience, known though usually unacknowledged, and there is no doubt that differences of temperamental nature are playing an important part in many problems of industrial efficiency, sickness absence, and labour wastage, as well as in personal happiness.

Now the person whose temperamental make-up plays a considerable part in the efficiency and happiness of an organization is the person in authority. It is obviously very difficult to study the temperaments of different people in authority and to relate them to differences in output or some other measure. Such evidence as is available has been obtained as a side issue to other investigations. There is evidence of differences of output directly connected with the temperament of the supervisor—a bright, healthy-minded person raising the quality and quantity of work. Also a high labour wastage and high sickness rates are sometimes correlated with a bully or a "Weary Willie" type.

Types of People in Authority

The following are easily differentiated: (*a*) the emotionally disintegrated person, or in plainer language the baby; and (*b*) the emotionally adolescent.

In the former each emotion as it is aroused is expressed regardless of consequences; the slightest crossing of his wishes results in what would be called in the nursery "tantrums." Anyone can easily wound his *amour propre*. He cannot bear anyone near the throne; he must be all-powerful, for not only must he have his own way but everyone must recognize that he has had it. Hence he tends to promote, in the absence of effective safeguards, weak rather than strong people, and then complains fretfully that nobody can take any responsibility. He also tends to believe in the all-powerfulness of his wishes: when, therefore, he gives an order he fails to envisage the means that often demand much time and work, so he harasses subordinates with fractious and querulous inquiries. If he has great organizing ability and the requisite physical and intellectual qualities, and the conditions are favourable, he does well—from some points of view—the very ruthlessness of the baby being an advantage. If he has poor or mediocre ability he drifts from one job to another, where there is no security of tenure: where there is, he makes the lives of subordinates miserable.

The outstanding characteristic of the emotionally adolescent is an inability to take effective responsibility. Subordinates have therefore the very difficult task of having at uncertain and irregular intervals to assume responsibility without power. Some dramatize themselves as leaders, speculate on what would happen if it were not for them, enjoy lamenting pessimistically about the state of the world in general, but seem to be unable to do what is in their power to improve their own world. To feel more sensitive than one's fellows but to be very little inconvenienced by it practically is to some people a most uplifting consolation. Such like an audience for whatever they are doing, and ride on the expressed approval of subordinates, seeing to it that they are surrounded by those who will express approval. They talk much of loyalty, which really means thinking they can do no wrong; to criticize in any way is to be disloyal.

The common factor in these undeveloped types is that they behave according to the emotion aroused in themselves by particular circumstances, and not according to the circumstances themselves. Hence the apparent inconsistency of their conduct considered over a period of time.

What are the temperamental characteristics of the person in authority who is emotionally grown-up? This is not easy to answer. But it is certain that the successful technician can be a very indifferent supervisor of other persons. The effect of power in some people is to let loose a number of qualities otherwise held in check.

Assuming the necessary intellectual and practical equipment, I should suggest that the first requisite is a sense of justice, a capacity for asking not "Am I getting justice?" but "Am I giving it?" Where there is a feeling in an organization that all will receive a fair deal there is an excellent basis for success. Next, a capacity for sympathy, which does not mean sloppy sentimentality but the power to sense the point of view of people different from ourselves. Next, vitality, which is not mere physical exuberance but controlled energy that inspires others instead of exhausting them. Lastly, a sense of humour, preventing oneself from taking oneself too seriously.

In broad outline these are some of the problems of a psychological nature that have been referred to the Industrial Health Research Board and the London School of Hygiene and Tropical Medicine either for investigation or for advice. A study of a number of industrial failures has revealed in the majority serious psychological maladjustment. The necessity for the industrial medical officer to understand the mental as well as the physical make-up of people, and the psychological as well as the material environment, becomes more urgent each year. Some organizations can afford to employ medically qualified men and women to look after the accidents alone, but in many this is a negligible part of the work, and an infinitely greater part belongs to a different category. The problem is not whether the psychological point of view shall or shall not be taken into account; its importance is already realized by a number of organizations. The problem is whether the medical officer will be adequate to deal with it; or must it be left to others?

HEALTH OF NEW YORK CITY

In a recent communication to the Press Dr. John L. Rice, the Health Commissioner of New York, points out for the benefit of those who may contemplate visiting the World's Fair in 1939 that the city lately has had the lowest death rate for automobile accidents of the large cities of the United States. As the Fair is still two years ahead the prospective visitor might reasonably wish to be informed as to the probability of this recent low rate holding until the date of his visit. As the rate has been falling year by year, from 19.7 per 100,000 in 1929 to 12.6 last year, the time trend seems to be favourable and the prospects good.

The Commissioner draws attention also to the successful results of the intensive campaign to reduce the diphtheria mortality. In 1927 the deaths were 717; from that year they have declined steadily to 68 in 1935 and 37 in 1936, the last figure being equivalent to a diphtheria death rate of 2.2 per 100,000 children under 15 years of age. The number of cases of poliomyelitis was reduced to 38 in 1936; in the previous year there had been 2,054, and in 1931 4,138.

Unfortunately the birth rate, too, has been steadily diminishing. In 1927 it was 19.6; in 1936 it was 13.4. The Commissioner takes a serious view of this tendency, especially as the practical cessation of immigration from over-seas has already slowed the growth of the city. It is of interest that there were three deaths from tularaemia, a disease known in this country only as a laboratory infection. Wild rabbits were the probable source, and among the sick were a butcher and a cook, who had doubtless contracted the disease through dressing the carcasses.

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THREE EVENTS IN PUBLIC HEALTH

When a distinguished public servant, after a period of probation in kindred work, has attained to a high administrative charge in the government of his country, has thereafter enriched his experience by wide excursions in other lands, and, finally, in the fullness of time has published a narrative covering the years of these, his more mature, activities, any considered opinions which he may think fit to express therein should carry weight. We therefore find it worthy of notice that Sir Arthur Newsholme, in his latest book,[1] which takes up the story of his life from the date of his assuming duty as Principal Medical Officer of the late Local Government Board, enumerates as the three most important external events bearing upon the progress of public health during his tenure of that position (1) the reports of the Royal Commission on the Poor Laws, (2) the coming into operation of the National Insurance Act, and (3) the declaration of war in August, 1914.

The old Poor Law medical relief had been aptly described by Dr. J. C. McVail as "a cripple supported on two crutches, the general voluntary hospitals on the one side and gratuitous medical work by private practitioners on the other." The cautious majority report of the Royal Commission on the Poor Laws recommended that the county and borough councils, acting through public assistance committees, should become the authorities for institutional treatment and general supervision, that there should be co-operation between the relief authorities and private charities, and that outdoor relief should be conditional on good behaviour. The more progressive minority report aimed at completing the break-up of the Poor Law, advised the withdrawal from the relief authorities of the care of the sick, the young, and the aged, and recommended a national scheme for unemployment. Contemporary discussion of these two reports tended to focus more on their divergences than on their common purpose. Owing to this and other major developments, including the war and the post-war problems, it was not till the Act of 1929 that local government reform was attempted and the care of the sick poor at last empowered to be supplied under statutes unrelated to the Poor Law.

[1] *The Last Thirty Years in Public Health. Recollections and Reflections on my Official and Post-Official Life.* By Sir Arthur Newsholme, K.C.B., M.D., F.R.C.P. George Allen and Unwin. (15s.)

The National Insurance Act of 1911 had in the meantime inaugurated a movement in the direction of giving effect to the recommendation of the minority report in favour of social insurance. Loss of health had long been recognized as an abundant cause of loss of employment and consequent destitution, and the Act was designed to provide "for insurance against loss of health and for the prevention and cure of sickness." Insurance against the impoverishment resulting from loss of health was provided under the Act by its sickness and disablement benefits, while the cure of illness was made available by means of medical benefit. Since under this last there was every inducement, or at least no deterrent, to the patient consulting his doctor betimes, it has had a preventive value.

The Act as a whole, though well intended, fell in many respects short of completeness, yet it suffered far more in its beginnings, not from its inherent defects, but from the unfortunate choice of early advisers by its prime mover, who, as Sir Arthur Newsholme says, first approached "the friendly societies and other less desirable industrial insurance societies," and did not, until the Bill had been framed, seek to establish close contacts with the Local Government Board or the British Medical Association. The Board could have placed at his disposal its wide experience of administration. The Association would have been able to speak with authority for the profession likely to be most affected, whether for better or for worse, by the impending new regime. Though the Association in the end secured what had come to be known as its "cardinal points," the Act, when placed on the Statute Book, had to encounter in many quarters both dumb and outspoken hostility resulting from previous differences of opinion, and it needed all the driving power of Sir Robert Morant and other civil servants to set the ponderous mechanism creaking into action.

Sir Arthur Newsholme speculates in an interesting way whether, if the reform of local government through the creation of larger areas which took place under the Act of 1929 had been effective before the inception of the national insurance scheme, the way would possibly have been opened for the introduction at that time of a more comprehensive medical service under the more auspicious control of the public health local authorities. Sir Arthur himself figures as a cordial encomiast of local authority administration, mainly on the ground that local authorities had been in his experience more disposed than Government Departments to seek or follow the advice of their medical officer. Indeed, he goes so far as to say that for their more efficient functioning central departments would do well to approximate to the

methods of the best local authorities. It is known, however, that the British Medical Association, at the period when the Insurance Bill was under negotiation, was disinclined to entrust medical insurance to the then existing public health authorities, and it is more than doubtful whether the profession, even given an expansion of local areas such as has taken place since, would have been inspired to a new confidence in town or county councils. The old order, however, may be changing and new affections gaining ground. It may or may not be significant that in the report of the Committee on Scottish Health Services it emerges that out of the six medical persons on the committee all but two were disposed to hand over the functions of Scottish Insurance Committees to the Scottish local health authorities.

Turning now to the third of Sir Arthur Newsholme's important influences during his years of office in the Local Government Board, we observe that he quotes with approval an opinion to the effect that the war was "the most gigantic imbecility since the Crusades." It would be unprofitable to debate this point in a medical journal, but we may note with appreciation his brief review of whatever of good in public health may be claimed to have resulted from the late war. An intensification of scientific progress in medicine and other fields, a new interest in nutrition—which has been well sustained—and a fresh impulse for the protection of maternal and infant life are among the benefits dearly bought by the years of conflict.

Much of what we have said necessarily relates to matters which are already receding into the middle distance. To many who knew of the events at first hand or themselves played a manly part in them our brief survey may read like a twice-told tale. Others, more recent perhaps in medicine, may find it informative. But for all of us it is good from time to time to re-examine some, at least, of the original foundations of our existing social fabric, in order that when we seek to raise it nearer to our cherished ideals what we add may be built with full knowledge of the facts, and so endure.

THE MAUDSLEY HOSPITAL

The medical superintendent of the Maudsley Hospital, Dr. Edward Mapother, has reported on its work from January 1, 1932, to December 31, 1935. The period under review has been an important one, for it was marked by the working out in practice of the Local Government Act, 1929, and Mental Treatment Act, 1930, and also included the economic crisis. The London County Council has taken a leading part in showing local authorities how to evolve a co-ordinated system for dealing with mental and neurotic diseases of all kinds, for educating those employed in this work in all capacities, and for research. The two Acts have much simplified the problems of determining what patients are entitled to treatment at the Maudsley Hospital, and of disposing of patients who need further institutional care. The unification under the control of the L.C.C. of a number of institutions providing nearly 35,000 beds and dealing in an adequately classified way with all grades of arrested development and mental disorder and decay gives the Maudsley access to a supply of clinical material which for abundance and variety is probably unique in the world. Dr. Mapother thinks that if the present opportunity is turned to full advantage the hospital may well become the main centre of advanced teaching in neuropsychiatry for the British Empire. As an instalment of future development he remarks that the clinical director of the Maudsley visits the British Post-Graduate Hospital each week as consultant in psychiatry and has, with the superintendent himself, taken part in the refresher courses which have been organized by that hospital.

The accommodation at the Maudsley Hospital has been increased in several ways. Large new out-patient premises have just come into use, and a garden villa has been built for eighteen patients. It consists of two small dormitories, one at each end, joined by a corridor off which open two rows of rooms, which are all provided for sound-proofing with cavity walls, double windows, and two pairs of double doors. Its success in producing quiet in the hospital and its neighbourhood is remarkable, for an uneasy patient can be immediately segregated in a sound-proof room by merely removing his bed from the veranda. By an arrangement with King's College Hospital the Maudsley is allowed to use its Pantia Ralli ward as an annexe. This is the largest trial of psychiatric treatment that has so far been made in an English general hospital. The ward holds thirty female patients in its main dormitory and five more in two double rooms and a single room. Most of the patients come from other wards of King's College Hospital and its out-patient department; they are of a type which has no disturbing symptoms and which needs rest rather than occupation. They are therefore mainly cases of combined mental and organic disorder, and are very suitable for demonstrations of early minor and recoverable forms of mental disorder given in the ward by the medical superintendent. Dr. Mapother remarks that the experience gained shows that a single ward in a general hospital can deal properly with recent cases of mental or even neurotic disorder only under the special conditions

of association with a psychiatric clinic. Propaganda for special wards in small clinics will, he believes, merely delay what has been found necessary over most of the civilized world—namely, the affiliation of completely organized psychiatric clinics to teaching hospitals. A villa for sixty private patients, and in-patient accommodation for thirty children, are to be provided.

The staff have carried out research into many aspects of mental disorder and have published a formidable list of papers. Dr. Mapother makes a personal appeal for a neuropsychiatric unit on Continental lines, with perhaps a hundred beds for patients whose organic nervous disease is not complicated by enough mental disorder to qualify them for admission under the Mental Treatment Act. The purpose of the unit would be to concentrate upon the study in the living patient of those organic diseases in which mental disorder is apt to occur but before it actually appears. Clinics of this kind, he says, have been responsible for saving 40 per cent. of general paralytics and for preventing or arresting much epilepsy and encephalitis. Such a unit could also correlate identifiable changes in the nervous system with mental disturbance, and thus ensure that psychiatry developed as an extension of organic neurology. If the unrivalled clinical material to be found in the general hospitals of the L.C.C. could be made available for a unit planned on these lines, the Maudsley, he says, would become a neuropsychiatric institution with hardly a parallel in any other country.

RETROPHARYNGEAL ABSCESS

In infancy and childhood the retropharyngeal glands which drain the nasopharynx are easily infected and readily break down and suppurate, giving rise to retropharyngeal abscess. This may prove a serious complication of such a comparatively trivial complaint as a cold or sore throat, and Lyman Richards of Boston,[1] who has lately reported a very careful study of 162 cases of retropharyngeal abscess, found that twelve had a fatal result. Retropharyngeal abscess is almost always preceded by a varying period of illness, such as sore throat, colds, otitis media, or cervical lymphadenitis; tuberculous disease in the cervical spine is only a rare cause in young children. The abscess develops acutely, so that in most cases some pressure symptoms, such as dyspnoea or dysphagia, or both, arise within a few days, while coexistent cervical lymphadenitis is common. Early and correct diagnosis is of the utmost importance if the condition is to be effectively treated, but Lyman Richards warns us against attempting to examine a struggling child with a retropharyngeal abscess, because fatal cessation of breathing has been known to occur from forcible opening of the mouth or the insertion of tongue depressors. The safest way to examine the pharynx in the suspected case is by a gloved finger which, introduced through the mouth, palpates the posterior pharyngeal wall. An *x*-ray examination is particularly valuable, as a lateral view may reveal an enlargement of the retropharyngeal space with encroachment on the pharyngeal or oesophageal lumen. Peritonsillar abscess (quinsy), for which the condition has been mistaken, is very rare in children and unlikely therefore to confuse the issue. Since incision into acutely inflamed glandular tissue is meddlesome and likely to spread infection, fluctuation should be elicited before operating. Until localization as evidenced by fluctuation has occurred supporting measures of a general character with hot irrigation are indicated. As has been pointed out, however, the abscess develops rapidly and then calls for free drainage. Anaesthesia should be avoided since the loss of laryngeal reflexes which it brings about increases the risk of aspiration pneumonia, while local congestion may produce respiratory embarrassment that calls for tracheotomy. Richards favours the internal operation, the child lying on the table with extended head and elevated shoulders; the tongue and larynx are lifted forwards with an angular tongue depressor and the posterior pharyngeal wall exposed. The abscess is opened by a single adequate incision, its contents aspirated, and the wound edges spread apart by opening the blades of a closed haemostat which has been introduced into it. In only two of the series of cases reviewed was external drainage carried out, and both patients died. A watch should be kept for secondary haemorrhage, which may necessitate carotid ligation.

[1] *New Engl. J. Med.*, 1935, 215, 24, 1120.

TREATMENT OF OBLITERATIVE VASCULAR DISEASE

During the last ten years many measures have been introduced with the object of increasing the blood flow through extremities affected by obliterative vascular disease. After extended trial many of these measures have been given up, but two—namely, sympathetic ganglionectomy, and suction and pressure therapy—have established themselves as of real and complementary value. A new addition to the list is intermittent venous occlusion, described by Collens and Wilensky.[1] The method is based on an observation by Lewis and Grant[2] that release of a cuff congesting but not occluding the circulation to a limb is followed by a transitory increase in blood flow. During the last eighteen months the authors have treated five cases of thrombo-angiitis obliterans, twenty-three cases of arteriosclerosis obliterans, and one case of frost-bite with gangrene, by inflating a cuff on the thigh to 60 to 80 mm. Hg for alternating periods of two minutes, the treatment lasting up to twelve hours a day. Of these twenty-nine cases pain was completely relieved in twenty-one, partially relieved in six, and unaffected in two. In seventeen cases of arterio-

[1] *J. Amer. med. Ass.*, 1936, **107**, 1960.
[2] *Heart*, 1925, **12**, 73

sclerosis with gangrene or ulceration the ulcers healed in seven, improved in six, and the treatment failed in four. In six cases intermittent claudication was greatly improved after two to four weeks' treatment. It is stated that these results were obtained in patients treated earlier by the ordinary conservative methods; and, indeed, one patient suffering from thrombo-angiitis "had received 300 c.cm. of 5 per cent. salt solution intravenously three times a week for seven years without relief of pain or any influence on the state of his ulcer"—a persistence which would be praiseworthy in a measure adequately supported either by reason or by experience: in this patient an ulcer of eight years' duration healed under intermittent venous occlusion in eight weeks. It is notoriously difficult to assess the value of any therapeutic measure either on an *a priori* basis or on the report of a single series of cases. In this instance the physiological basis of the treatment is not apparent, for although increase in blood flow does undoubtedly follow release of partial or complete occlusion of the blood vessels to a limb, this increase is no more than enough to discharge the blood-flow debt incurred during the period of circulatory obstruction (except when complete occlusion is maintained for long periods[3]). Taken at their face value the results are, however, impressive enough for us to hope that this method of treatment will receive a thorough trial. A point in its favour is that an apparatus designed to inflate intermittently a sphygmomanometer cuff should require little ingenuity or expense to devise.

MEDICAL CLASSICS

Many medical men in England hardly know the names of those who in their time have been leaders in the profession, and few could pass even an elementary examination upon their periods or what they had done to become famous. Pott and Colles, Simpson, and even Lister denote for them conditions and not living personalities. Dr. Emerson Crosby Kelly of the department of surgery at the Albany Medical College has set himself to remedy this gap in medical knowledge. He is editing *Medical Classics*, and promises ten issues a year.[4] The first part of the first volume is devoted to Sir James Paget and is wholly admirable. It begins with a list of the biographies hitherto published, and this is followed by a bibliography of Paget's writings, which omits to state that the address to the Abernethian Society in 1885 was printed in full by J. E. Adlard. Then come reprints of the papers on osteitis deformans and disease of the breast, illustrated by the drawings and in each case by a facsimile of one printed page of the original account. There is, too, a frontispiece of Sir John Millais' striking portrait. The block reproducing the portrait is not very satisfactory, and it would have been better if it had been made from the original picture. The series is well worthy of support, and there are promised Sir Charles Bell, Addison, Brodie, Hodgkin, and Parkinson on the British side; Oliver Wendell Holmes, Morton, Halsted, Murphy, and McDowell on the American; Billroth, Banti, Koch, and Bassini from the Continent. A noble group whose work is well worth recalling.

[3] Freeman: *Amer. J. Physiol.*, 1935, **113**, 384.
[4] Subscription price 10 dollars or 47s. 6d. per annum; British agents, Messrs. Baillière, Tindall and Cox.

CENTRES FOR SEX FUNCTIONS

It is now established that ovulation, menstruation, and pregnancy are largely controlled by secretions from the anterior pituitary, but the regulation of the activity of the pituitary itself is unknown. Investigations during the last few years have suggested that nerve fibres pass from a centre in the hypothalamus to the pituitary, and that the secretion of pituitary hormones is a response to stimuli from such a centre or centres. Further evidence in support of a nervous control of the anterior pituitary and generative functions has now been provided by the interesting experiments of G. W. Harris,[1] who was successful in inducing pseudo-pregnancy in rats by electrical stimulation through the head during oestrus. When the oestrous cycles were of normal rhythm the animals were stimulated, under ether anaesthesia, at the stage of oestrus assessed by the presence of cornified cells only in the vaginal smear. The stimulus used was an alternating current of 50 cycles, with a voltage varying between 20 and 40. The time of stimulation was three seconds on, seven seconds off, three seconds on; and then this was repeated after an interval which varied between five minutes and twenty-four hours. The most constant results were obtained with a potential difference of 30 volts and a time interval between the two sets of stimuli of one to one and a half hours. Forty-three stimuli applied at various stages of oestrus in twenty-one rats gave twenty-eight (68 per cent.) positive responses (delays in the cycle of ten days or over). The delays were counted from the metoestrus following stimulation to the next period of oestrus. Although the ovarian cycle in the rat is very difficult to follow, the response to the head stimulation was shown in several ways to be a true pseudo-pregnant response, the most convincing method being the production of deciduomata. A similar stimulus applied to the lumbar spinal cord gave no definite results. The figure of 68 per cent. positive results is in accordance with those obtained by other workers on the induction of pseudo-pregnancy in the rat by stimulation of the cervix uteri, and G. W. Harris's work partly confirms the experiments of F. H. A. Marshall and E. B. Verney,[2] who brought about ovulation and pseudo-pregnancy in the rabbit by electrical stimulation of the lumbar spinal cord and head. It is presumed that some part of the nervous pathway to the pituitary gland is stimulated by this means. Harris's experimental work calls to mind the conclusions drawn from a clinical standpoint in a paper by G. W. Theobald,[3] who produced clinical evidence to show that the regularity of the menstrual cycle depends on a menstruation centre in the hypothalamus, and that ovulation, pregnancy, and parturition are similarly controlled by a centre or centres in the hypothalamus. He postulated that the afferent stimuli to the menstruation centre are provided by the

[1] *J. Physiol.*, 1936, **88**, 361.
[2] Ibid., 1936, **86**, 327.
[3] *British Medical Journal*, 1936, **1**, 1038.

ovarian hormones and by nervous stimuli from the generative organs and the cerebral cortex, and that the efferent stimuli from the centre operate through the anterior pituitary gland and to a certain extent through nervous impulses to the generative organs.

VASCULAR RESPONSES TO CO_2

Changes in the tension of carbon dioxide in the blood have been shown by various investigators, working mainly with animals, to give rise to changes in blood pressure. Hyperventilation with consequent drop in CO_2 tension in the blood in anaesthetized animals leads to a fall in blood pressure. Experiments of this nature in man are complicated by the fact that there is a compensatory vasoconstriction during hyperventilation involving deep inspirations. It is possible, however, for moderate hyperventilation to be carried out for periods up to fifteen minutes without producing a vasoconstriction, as was shown by Bolton, Carmichael, and Stürup.[1] Without careful control of such complicating responses it is impossible to come to clear conclusions by experiment on human subjects. On the other hand, it is rash to apply to the human subject the results of experiments on anaesthetized animals or pharmacological tissue preparations. Bolton, Carmichael, and Williams[2] have recently investigated the peripheral vascular responses to changes of CO_2 tension in the blood in normal subjects, patients with a sympathectomized limb, others with a transverse lesion of the dorsal cord, and others with a lesion of the brachial plexus. Those with a nerve lesion all gave clear clinical pictures. The technique of investigation was to study plethysmographic tracings, taken from toes and fingers, respiratory tracings, and systolic blood pressure readings, and to correlate these with the changes in the blood. The alterations in blood gas tensions were produced by breathing 10 to 20 per cent. CO_2 in air; by moderate overbreathing up to fifteen minutes; by inhaling pure oxygen; by rebreathing in a closed system, the inspired air being passed over caustic potash; by breathing pure nitrogen; and by holding the breath or by rebreathing until dyspnoea supervened. In these ways it is possible to increase or decrease the partial pressures of CO_2 and O_2 in the blood and to increase the CO_2 and diminish the O_2 partial pressures. In order to alter the condition of the peripheral vascular bed the blood temperature was raised or lowered by immersion of the legs in tanks of hot water at 44° C. or of cold water at 14° C. In this way general vasodilatation or vasoconstriction could be maintained for long periods. Precautions to avoid venous congestion and movement of the part on the plethysmograph, and to avoid psychic disturbance of the patient, have to be taken to prevent artefacts. The results obtained can only shortly be referred to, but were of great interest. Increase in tension of carbon dioxide in the blood was followed by a peripheral vasoconstriction and then by a profound vasodilatation if the original condition was one of peripheral vasodilatation. At the same time there was a rise in blood pressure. If the vessels were initially constricted there was no further constriction, but there was still a rise in blood pressure of much the same magnitude as occurred when the vessels were initially dilated. Hence it is concluded that the rise in blood pressure is due to constriction of the vascular bed in the splanchnic region and in the muscles. The subsequent dilatation and fall in blood pressure is regarded by these authors as a compensatory mechanism not related to the rise of CO_2 tension in the blood. These changes were not obtained in the affected limbs of subjects with lesions of the dorsal cord or of the brachial plexus. From this it is deduced that the effect of the carbon dioxide depends upon an intact nervous system and is independent of cardiac output (the latter view having been reached from animal experiments by other investigators). Very interesting was the finding that the effects were absent in a sympathectomized limb, but that mere severing of the somatic nerves did not abolish the response. It therefore seems justifiable to conclude that the response is dependent upon an intact sympathetic supply—that is, upon active vasomotor changes in the investigated limb—and that the control is central. These effects could be produced only when there was an increase of CO_2 tension; decreased CO_2 tension and increased or diminished O_2 tension had no such effect. The results were perhaps not unexpected, but their demonstration in man presents a beautiful picture of what can be achieved by the proper use of clinical material.

[1] *J. Physiol.*, 1936, **86**, 83.
[2] Ibid., 1936, **88**, 113.

EDUCATION OF THE BLIND

There was a book that was found in most households a generation or two ago entitled *Enquire Within upon Everything*. The report of the Joint Committee of the College of Teachers of the Blind and the National Institute for the Blind upon the Education of the Blind[1] might well have been called "enquire within upon everything concerning the mental, moral, social, and industrial training of the blind." We have seen no work of the kind that is so well balanced in its judgements, so complete in its survey, and so well and clearly expressed. The authors of this report gave much time through five years to its preparation, and that time has been well spent. The scheme of training the blind in this country is on the whole well planned and well carried out. One of the most noteworthy features of blind training is its continuity. It starts with the nursery or infant school and proceeds to its fruition in the vocational training and the assistance or direction of the early workers. Nothing like this is to be found in the training of sighted children. These leave school for the most part at the age of 14 and their vocational training is not received through the schools, but from the drill of the employment that they happen to secure and such technical classes as they have the energy to join. The blind child is within the formative influence of a directive and happy school environment over a wide range of years, from infancy to manhood. The responsibility of the teachers of the blind is therefore great. On the other hand, the blind suffer severely by the loss of sight. Though they seem to the casual

[1] *The Education of the Blind. A Survey.* London: Edward Arnold and Co. (7s. 6d.)

observer to be singularly placid, calm, self-contained, and undisturbed, there is evidence to prove that this is far from the truth. The limitations imposed by their handicap have a severe mental reaction. Blindness is the subjective annihilation of the visible universe. The blind are driven in upon themselves. To sit idle is to be lost to the world and to be filled with the ceaseless turning of the mills of the mind without enough grist to grind. There is a risk that the habit of brooding may be set up. Hence the long-continued training of the blind, irrespective of the need for their industrial equipment, if they are to take any place in the effective life of their time. The limitation of their senses is reflected in the limitation of their industrial opportunity. Nevertheless it is found that there are compensations in the mastery of manual work, and that many of the blind rank on a level with the skilled worker in occupations for which they are eligible. One of the problems to be faced arises from the success of the measures for the prevention of blindness. Places in schools now outnumber the pupils. The report suggests that reducing the number of the schools and increasing the accommodation of those retained would give greater scope for classification in training, which is difficult when the numbers in any school are small.

BIOLOGICAL STUDY OF DRUGS AND FOODS

The annual report of research work done in the College of the Pharmaceutical Society in 1936 contains a record of a wide variety of activities. The staff of the chemical department has worked on the synthesis of new antiseptics of the acridine series and of local anaesthetics, and are in process of constructing synthetic drugs with a quinine structure. Dr. Coward, in the nutrition department, has studied improved methods for the biological standardization of the vitamins, and by the use of the statistical methods introduced during recent years has succeeded in shortening some of the tests. This department has carried out biological tests on the vitamin D activity of 179 cod-liver oils in the year under review. The average findings during the last three years show the curious result that whereas the average potency of seventy samples tested in 1934 was about 160 units per gramme, the average potency of sixty-one tested in the last half of 1936 was 89 units. The minimum pharmacopoeial requirement is 85 units per gramme. Professor J. H. Burn, in the pharmacology department, records many valuable researches. A method for standardizing cortical extract has been developed which will facilitate the clinical use of this endocrine preparation. Researches on the effect of vitamin deficiency or resistance to drugs have shown that vitamin D lack lowers the resistance of rats to neoarsphenamine. This is a very interesting line of research because the extensive individual variation in response to drugs is an important limiting factor in some forms of therapy and any information about possible factors increasing this variation is important. Another research of clinical interest is the measurement of the extent to which fever modifies the response of rabbits to insulin. It has been shown that fever can abolish the response and that this inhibition does not occur in hypophysectomized animals. The effect of fever on insulin is a problem of clinical importance, and this work promises, moreover, to throw light on the mechanism of the febrile reaction.

LONDON MEDICAL GRADUATES SOCIETY

The University of London, lacking a long history and a local habitation, has not yet gathered those traditions, memories, and ancient buildings that make the senior seats of learning something more than academies of instruction. When in June, 1933, King George V laid the foundation stone of the new headquarters he marked a definite stage in the growth of London University. The magnificent new buildings now rising in Bloomsbury, situated as they are between the British Museum and University College, with such institutions as the London School of Hygiene and Tropical Medicine near by, will, when completed, give London a university quarter worthy of the name. The University will soon have a structure in stone and bricks to embody the corporate spirit that is so essential to its full growth, and in no better way can the spirit be fostered than in the formation of societies within the University of men and women of common intellectual interests. Such a society is that of the University of London Medical Graduates, whose aims are set forth in a letter printed in this issue at page 531. Sponsored by Mr. W. McAdam Eccles, Dr. C. A. H. Franklyn, Mr. T. B. Layton, and Sir StClair Thomson, the society was founded in 1928. Fifty members were present at the first annual dinner in May, 1928, and in December, 1936, the membership was 670. The growth of the society has been steady, but the membership is still small in proportion to the large number of students in the Faculty of Medicine. The intense individualism of London hospitals has played a great part in their development and has been responsible for much excellent work. But in this age, when co-operation has been found more efficient and economic than competition in many spheres of activity, individualism carried too far is apt to act as a brake on progress. Some of the metropolitan medical schools have already recognized this in their efforts to pool teaching resources for the benefit of their students. But for these efforts to be really successful the narrow parochialism which, it must be confessed, tends at times to manifest itself in London teaching hospitals, can only disappear when medical graduates and students of all the hospitals can meet each other in the friendly and informal atmosphere of such a society as that of the University of London Medical Graduates. Those who do not yet belong should apply for membership by writing to the honorary secretaries, 11, Chandos Street, Cavendish Square, W.1.

We are asked to state that the fourth biennial informal conference, organized by the British Empire Cancer Campaign, will be held on Tuesday and Wednesday, March 16 and 17, at the Royal Society of Medicine. Admission is by card only, after application to Mr. Lawrence Abel or Dr. R. W. Scarff, joint honorary secretaries of the Organizing Committee (British Empire Cancer Campaign), 12, Grosvenor Crescent, London, S.W.1.

ENDOCRINES IN THEORY AND PRACTICE

This article is one of a series on Endocrinology contributed by invitation

THE PHYSIOLOGY OF THE ENDOMETRIUM AND UTERINE MUSCLE, AND OF THE OVARIAN CYCLE

BY

J. M. ROBSON, M.D., D.Sc.

During the period of sexual maturity cyclical changes occur in the uterine endometrium and muscle. These changes are closely correlated with alterations, morphological and secretory, taking place in the ovaries, and it is now known that the gonads directly control the condition of the uterus by means of hormones released into the blood stream. The types of cycles observed in different species and the details of the changes taking place in the sex organs of these species show almost bewildering variations. In this article it is therefore intended to consider the conditions present in the primates (especially in the human subject) and to refer to experimental findings in animals only in so far as this will clarify our understanding of the problem in primates.

Broadly speaking, the sex cycle may be divided into two main phases: (1) pre-ovulatory, and (2) post-ovulatory. Obviously the extrusion of the ovum from the mature Graafian follicle (that is, ovulation) acts as the dividing point. In the pre-ovulatory period the Graafian follicles are gradually growing and maturing in the ovaries, and these organs are releasing a hormone (oestradiol*) which controls the changes taking place at that time in the uterine endometrium and muscle. Thus this phase may also be called the follicular phase of the cycle. After ovulation a corpus luteum is formed in the site of the follicle from which the ovum has been extruded. The corpus luteum also produces oestradiol, but in addition it secretes a second ovarian hormone, progesterone, which is responsible for the characteristic alterations observed in the uterus during the second phase of the cycle, which may therefore be called the luteal phase.

At ovulation one of two things may happen: (1) the ovum may not be fertilized, or (2) it may be fertilized. If it is not fertilized then the period of activity of the newly formed corpus luteum is short (about fifteen days in primates) and the cessation of its secretory function (that is, of the secretion of progesterone and oestradiol) is followed by the degenerative changes in the uterine endometrium which constitute menstruation. During the period of activity of such a corpus luteum (that is, when no developing ovum is present in the uterus) alterations are nevertheless produced in the uterine endometrium and muscle which are very similar to those observed in the early stages of a true pregnancy and represent a preparation of the uterus for the nidation and development of the embryo. This phase of luteal activity, which terminates in the degenerative process of menstruation because no ovum becomes embedded in the endometrium, has therefore being termed "pseudo-pregnancy."

* The general term oestrin is used for a number of substances which have oestrogenic properties—that is, produce alterations in the secondary sex organs of the ovariectomized lower rodents, similar to those seen at heat or oestrus. There is evidence that the substance actually secreted by the ovary is oestradiol, and this term will be used when referring to that particular hormone.

When ovulation is followed by fertilization true pregnancy supervenes, and the period of activity of the corpus luteum is considerably prolonged. Moreover, an organ (the placenta) develops which acts as an additional source of the ovarian hormones. For there is now considerable evidence that in some species at least the placenta may secrete both oestradiol and progesterone. In the human subject during pregnancy the placental secretion alone may be sufficient to maintain the functional alterations produced by these two ovarian hormones, and thus removal of the ovaries from the pregnant woman may be followed by continuation of normal gestation leading to a normal parturition.

Changes in the Uterine Endometrium During the Ovarian Cycle

Let us now consider in some detail the actual changes in the uterine endometrium and muscle during the various phases of the sex cycle. The alterations in the endometrium have been studied in monkeys and in man by a number of observers, and have for the purpose of description been divided into certain stages. These are, of course, not sharply demarcated, but gradually merge into one another. The description given by Shaw and by Schroeder on the basis of their clinical studies of the human uterus will be followed. In the early stages of the cycle (that is, in the period immediately following the end of menstruation) the regeneration of the destroyed mucosa takes place, and shortly afterwards a resting stage is reached; the mucosa is lined by a low columnar epithelium, the blood supply is relatively small, and the vessels are not conspicuous. This is rapidly followed by a proliferative process. Convolutions begin to appear in the glands, and by the end of the second week after the beginning of the previous menstruation all the glands are as a rule convoluted; the epithelium is of a high cylindrical type, and a large number of mitoses may be observed.

This stage of the sex cycle—that is, approximately the first two weeks after the beginning of menstruation—represents the follicular phase, during which the Graafian follicles in the ovaries are gradually ripening preparatory to ovulation. The final maturation process involves only a limited number of follicles, and in primates usually only one; the antrum becomes enlarged, the follicle approaches the surface of the ovary and finally bursts, and the ovum is extruded. The final growth and ovulation of a single follicle (or of a group of follicles, as is usually the case in the lower animals) is accompanied by the destruction of all remaining follicles. During the phase of follicular maturation oestradiol is secreted by the ovarian substance and by the follicles, and is responsible for the proliferative processes in the endometrium which follow menstruation. A similar stage is observed in a large number of animal species in which ovulation is also preceded by proliferative changes in the uterine endometrium, produced by the hormone oestradiol secreted by the ovaries during the stage of follicular maturation. Incidentally, in certain species of monkeys marked swelling of the external genitalia is observed towards the end of the follicular phase. This swelling is presumably evidence of an intense secretion of oestradiol, as it can be induced in the ovariectomized animal by the injection of the hormone.

Immediately after ovulation there is haemorrhage within the cavity of the follicle. The follicular epithelial cells are, however, nearly all retained, and, indeed, the essential part of the corpus luteum is formed chiefly from these cells, which begin to hypertrophy immediately after ovulation; there is no evidence, though, of cell division. Very soon the clot organizes and there is growth of connective tissue from the theca. The hypertrophy of the epithelial cells continues, and the mass is penetrated by connective tissue. The corpus luteum then becomes fully organized and the follicular epithelial cells contain the characteristic lutein of the fully formed corpus luteum. The cavity in the organ also gradually disappears.

After ovulation certain well-defined changes occur in the uterine endometrium. The glands become fuller, wider, and richly convoluted. Translucent areas are to be seen behind the nuclei of the gland cells, which shortly begin to secrete. About a week after ovulation additional changes appear and three layers can now be distinguished in the endometrium:

1. A layer immediately below the surface epithelium, in which the cells are tightly packed round the gland ducts.

2. An oedematous layer, which surrounds the glands and in which dilatation of the capillaries has occurred.

3. A basal layer, in which the oedema and hypertrophy are absent.

The hypertrophy continues up to the twenty-eighth day after the beginning of the previous menstruation, and degeneration then sets in in the form of disorganization and disintegration of the glands of the superficial and middle zones. Following this, and apparently as a secondary phenomenon, blood is extravasated and haematomata form. The blood and epithelium are then shed (menstruation) and regeneration of the epithelium subsequently takes place, thus starting again the follicular part of the cycle.

The period between ovulation and menstruation represents the luteal phase of the cycle for the non-pregnant subject. During this period both progesterone, the specific luteal hormone, and oestradiol are produced; in the primates the corpus luteum secretes both these hormones, and degeneration of the corpus luteum is followed by menstruation. In lower species, too, ovulation is succeeded by the formation of corpora lutea which, even in the absence of pregnancy, usually have a definite period of secretory activity. In many animals specific changes are induced in the uterine endometrium by the luteal secretion homologous to the secretory phase in the primates and constituting a preparation for the nidation of the ovum; but the cessation of the luteal function at the end of pseudo-pregnancy is not, in the lower animals, accompanied by the marked degeneration of the endometrium observed in the primates at menstruation.

Changes in the Uterine Muscle During the Ovarian Cycle

In addition to the well-known changes in the endometrium certain alterations have also been described in the uterine muscle during the various phases of the sex cycle, though there is much difference of opinion as to the changes occurring in primates. For this reason the experimental data in some animals which led to the investigations in Man will first be given.

Two main and antagonistic actions have been extensively investigated in the rabbit: (1) an increase in physiological activity, and (2) a decrease in physiological activity. Certain criteria have been elaborated for the measurement of the physiological activity of the uterine muscle. These are: (*a*) the reactivity of the muscle to oxytocin—that is, the dose of oxytocic hormone of the posterior pituitary lobe necessary to cause contraction of the muscle either *in situ* or suspended (in strips) in some oxygenated physiological solution; and (*b*) the spontaneous rhythmic contractions exhibited by the muscle *in situ*, a method of measurement being used which will disturb the uterus as little as possible and not stimulate the contractions.

Now in the rabbit an increase in physiological activity is witnessed during the follicular phase of the cycle, and it can also be brought about by the injection of oestrin into the ovariectomized animal. Hence during this phase of the cycle the muscle will contract when quite small doses of the oxytocic hormone are injected intravenously into the animal, or are added to the bath of physiological solution in which the muscle is suspended. On the other hand, a decrease in physiological activity of the uterine muscle is seen, after ovulation, during the luteal phase of the cycle, and this decrease can also be produced by the injection of progesterone in animals which have passed through a (natural or experimental) follicular phase. In the luteal phase the uterine muscle does not respond to large doses of oxytocin injected into the animal or added to the solution in which it is suspended, and its rhythmic contractions *in situ* are small or absent.

Preliminary investigations of the uterine muscle in Man suggested that alterations occur similar to those obtained in the rabbit. It was apparently found that during the follicular part of the cycle—that is, for about a fortnight after the beginning of menstruation—the uterine muscle would contract after the injection of an extract of the posterior pituitary lobe and that it showed quite appreciable spontaneous rhythmic contractions. On the other hand, after ovulation and the formation of a corpus luteum (that is, during the luteal phase of the menstrual cycle) the reactivity of the uterine muscle to the posterior pituitary extract was abolished and the contractility of the muscle was depressed. The onset of menstruation after the degeneration of the corpus luteum was again accompanied by a return of the reactivity and activity of the uterine muscle. Hence, as in the rabbit, the follicular phase of the human cycle was apparently accompanied by an increase in the activity of the uterine muscle, while in the ensuing luteal phase there was a decrease in this activity.

Later observers, however, have been unable to confirm these results, and there is strong evidence now that, under certain conditions of registration, the uterine muscle may show rhythmic contractions and a response to an extract of the posterior pituitary lobe during the luteal phase of the cycle too. This evidence also agrees with experimental data which have been obtained on other animals. For it has been demonstrated that the luteal hormone, progesterone, does not inhibit the physiological activity of the uterine muscle in any species so far investigated other than the rabbit, which, it would appear, is exceptional in so far as the specific action of progesterone on the uterine muscle is concerned.

On the other hand, there is stronger support for the view that the follicular hormone, oestradiol, increases the activity of the uterine muscle in several species and that it may be a factor in controlling the activity of the muscle in primates. Further investigations of these questions are, however, necessary, and in the meantime it appears desirable to reserve final judgement.

The Anovular Cycle in Primates

The general description so far given for the alterations in the uterine endometrium during the various stages of

the menstrual cycle probably applies to the great majority of cases where the cycle is divided into two stages (that is, follicular and luteal) separated by ovulation. There is, however, no doubt that occasionally menstrual discharges may arise in the absence of ovulation. This phenomenon was first noted in monkeys, which were kept under experimental conditions and at times showed regular cyclic discharges of blood which could not be differentiated from normal menstruation (apart from an examination of the uterine endometrium or of the ovaries), although there had been no ovulation and no formation of corpora lutea. There is now evidence that such anovular cycles also occasionally appear in women, though there is some difference of opinion as to the frequency of these.

It seems likely that the sequence of events in such cycles is somewhat as follows. The follicular stage is normal and the follicles gradually mature to the usual pre-ovular condition. But the final ovulation does not take place (possibly because of a deficient pituitary stimulation) and atresia of the follicles then supervenes. The secretion of oestradiol is, however, continued by the ovaries and decreases at the usual time, leading to uterine bleeding. In those circumstances there is bleeding from a proliferated endometrium subjected to the action of oestradiol only, and not, as is usually the case, from a secretory endometrium subjected to the action of progesterone and oestradiol.

There has been some discussion as to whether the term "menstruation" should be applied to the bleeding in such anovular cycles, and it has been suggested that the nomenclature should be reserved for bleeding from an endometrium brought to the secretory stages under the influence of the hormone produced by the corpus luteum. As it is difficult to differentiate between the two types it seems probable that cyclical uterine bleeding in primates will be called menstruation, even when there is no ovulation. It is important, however, to realize the functional difference between ovular and non-ovular menstruation, since in the latter there can be no fertilization and no implantation. Indeed, there is some suggestion that certain cases of sterility in women are due to the occurrence of non-ovular menstrual cycles.

Under certain pathological conditions the follicular phase, which generally ends at about the middle of the menstrual cycle, is continued. Ovulation and corpus luteum formation do not occur, but the secretion of oestradiol goes on beyond the normal duration of the cycle. The uterine endometrium is thus acted upon by the follicular hormone for long periods, and pathological changes take place in it which result in the prolonged bleeding which constitutes metropathia haemorrhagica. Since this condition is due to the continued action of the oestrous hormone without any luteal secretion whatever, treatment with progesterone appears to be indicated, and has indeed been used successfully. Incidentally, gonadotropic hormone preparations have also been used successfully in the treatment of metropathia, but their mode of action is at present unknown.

(*To be continued*)

The Trustees of the Rockefeller Foundation have given a further research scholarship for a year to the Institute of Medical Psychology (Tavistock Clinic), London. The fellowship is held by Dr. A. T. Macbeth Wilson, who is engaged on the study of certain diseases—peptic ulcer, essential hypertension, diabetes mellitus, and Graves's disease—whose onset has often been related to emotional disturbances in the lives of patients.

SURGERY OF THE THYROID GLAND

LECTURES BY SIR THOMAS DUNHILL*

LECTURE II

In his second lecture, delivered at the Medical Society of London on February 24, Sir THOMAS DUNHILL dealt with the complications of toxic goitre. Those affecting the cardiovascular system were the most common. It was not so much the intensity of the intoxication as the age or quality of the heart muscle which determined its breakdown. Considering the prevalence of the disease up to early adult life the proportion of cases of heart failure during that period was small. In elderly patients, on the other hand, the incidence of cardiac complications was high, despite the well-known fact that symptoms might be mild. His impression was that the number of patients gravely ill with congestive heart failure who came for operation was tending to decrease, but the number coming with auricular fibrillation before a severe grade of heart failure had arisen was large and increasing, the reason being that when a patient was found to have auricular fibrillation a goitre was now looked for as a possible cause. It was becoming recognized that a long-standing goitre, frequently regarded as innocuous, might lead to this trouble. Some of his cardiologist friends maintained that thyrotoxicosis did not actually damage the heart muscle; in the majority of cases when the toxicity had been eliminated recovery appeared to be complete. But it must be remembered that thyroid toxaemia often continued into the period of life when arteriosclerosis or other degenerative processes were commonly seen.

Heart Risk

When the operation began to be practised it was quickly realized that the attendant heart risk could not be ignored. The first question was, and still remained, whether the heart was strong enough to stand the operation. Lists of contraindications were published, and prominent on those lists was enlargement of the heart, irregular rhythm, and congestive heart failure. It was also thought that even though thyroid intoxication had caused breakdown and the toxic goitre had burnt itself out the damage to the heart was permanent and nothing could be achieved by operation. He was speaking of views current from thirty to twenty years ago, but it might surprise his hearers as it had surprised him to know that he had been met recently with the same objection by two men occupying high positions in the profession in London.

The total number of cases with fibrillation and congestive heart failure on which he himself had operated was 305; the number that had regained normal rhythm was 248, or 81.3 per cent. Among these the rhythm returned spontaneously in 147, and quinidine had to be used to bring it about in 101. It was expedient to give quinidine if the rhythm did not become regular seven or eight days after the operation. A very few patients had proved intractable to this while in the surgical wards, but some or most had regained normal rhythm when later admitted to the medical wards. Other factors, such as arteriosclerosis or endocarditis, might be present and account for failure in some cases.

Following operation and with adequate time given for recuperation, many patients appeared to regain normal health. Others lived happy and tranquil lives so long as they kept within the limits of their strength. Some felt so well that it was difficult to keep within those limits, and they paid the penalty.

High Blood Pressure

The association of high blood pressure with toxic goitre concerned the physicians primarily, but it was of importance to surgeons also. Any surgeon who saw many cases

* Continued from p. 461.

of thyrotoxicosis knew that in some of them the blood pressure remained within normal limits, in others the systolic pressure alone was raised, while in a smaller number both the systolic and the diastolic pressures were raised. When this last condition was found it had probably occurred independently of the goitre. The condition must be taken into account when giving a prognosis.

On cardiac failure not due to thyrotoxicosis the lecturer spoke with reserve. When the extent of cardiac function following thyroidectomy was seen it opened up the possibility of relief in hopelessly incurable congestive heart failure by relieving the heart of the driving force of the thyroid even when the failure was not caused by thyrotoxicosis. The selection of cases was in the sphere of the cardiologist. Here the surgeon was a "carpenter" only.

Glycosuria

Glycosuria was the second most common complication of toxic goitre. This was more particularly a matter for physicians, and it was not his business to differentiate between true diabetes and the less serious type of glycosuria. He did not know what proportion of the population had a low carbohydrate threshold, but toxic goitre was one of the factors that disturbed the narrow margin of safety. The severity of the complications and the length of time they had been present affected the prognosis.

One patient, aged 46, whom he saw in 1933, had developed the disease in 1918 after her husband had been killed in the war. *X*-ray treatment was given in 1922. In 1932 she was stated by a physician to be "almost in coma." Fibrillation was then present also. The daily dose of insulin required was then 90 units, and she was kept in bed for twelve months. Operation was performed fifteen years after the onset of the disease. Following operation the daily dose of insulin could be reduced to 20 units, and she lived an active life, with some limitation.

It all came down to the need for adequate supervision. Some of these patients were very fond of food unsuitable for them, and were not willing to exercise self-discipline. "We have some skill in curing the disease, but little in restraining the appetites of our patients."

Another aspect of this subject was interesting. From his records he found that three patients had developed diabetes subsequently to operation, although the urine after operation had been sugar-free and they had never had diabetes previously. In one of them the disease appeared three years, in another four years, and the third six years after the operation.

Disturbances of the Central Nervous System

Disturbances of the central nervous system might go on to such an extent that the mentality became unbalanced, and cases of this kind were a greater anxiety than those arising in any other complication of the disease. With all the others the risks could be judged and management arranged accordingly, but with the central nervous system there were all too few guiding indications, and none of them sure. If success was achieved the transformation was almost miraculous, but this occurred too seldom for any general rule to be laid down. In this condition operation was not to be undertaken or contemplated without the advice of a psychiatrist as well as the physician in charge; it was altogether beyond the ability of the surgeon to decide among the different types of mental derangement.

A patient, aged 66, had been removed from a general hospital to a mental hospital, where she had been an inmate for some months when he saw her. She had been a normal woman until the onset of thyrotoxic symptoms; she became quite well mentally following operation.

A patient, aged 54, was ill with toxic goitre, but was reasonably well controlled. She afterwards became alarmingly ill, delirious, and lost 12 lb. in sixteen days; fibrillation had been present all along. Some time later he ligated the superior arteries, seventeen days afterwards he ligated the inferior arteries, and sixteen days after that performed resection. About four days after the resection a lucid interval occurred. On the following day it reappeared and lasted longer, but delirium again returned. Ultimately, however, her mind cleared and she became normal, and had been clear and cheerful ever since.

There was another side to the picture. A woman aged 57 had had a goitre for the greater part of her life, but the symptoms were regarded as comparatively mild, notwithstanding that her heart had fibrillated intermittently for years. She had been on several occasions an inmate of a mental home. With the fibrillation present and the raised pulse rate there was no doubt of the thyrotoxicosis. After operation the heart became slower and the rhythm regular. But after some months the mind gave way again. He had found the greatest difficulty in patients of the *forme fruste* type, where the thyroid was undoubtedly involved but the picture was incomplete, and where other members of the family showed mental instability as well as the patient herself. Altogether he had had forty-five patients who were definitely mental, most of whom had been in some mental home, and thirty-nine of these were now normal.

Exophthalmos, Loss of Weight, and "Masked Hyperthyroidism"

The cause of exophthalmos had given rise to much speculation. The extent to which it disappeared was probably dependent on the length of time it had previously been present, long-continued spasm leading to organic change. Exophthalmos could be such a disfigurement that unless improvement by other means was definite operation should not be delayed.

As for loss of weight, generally on rest and treatment the loss was stayed and some weight put on. There were some patients of this type who failed to show any response to iodine, but not all the patients with this disease lost weight. Evidently the knowledge of thyroid secretion and metabolic factors was far from complete.

The term "masked hyperthyroidism" had come into use and required examination. The adjective was useful, but Sir Thomas Dunhill doubted the wisdom of using it. It was employed in four conditions: (1) when there was no enlargement of the thyroid gland in the neck but a substernal or intrathoracic goitre alone was present; (2) when enlargement of the gland in the neck was not detected by the medical attendant or physician even when obvious to the surgeon; (3) when an enlarged gland existed together with heart failure, but the causal relationship had been ignored (he would not call this "masked hyperthyroidism," "it is the practitioners who are masked, eyes and brain too"); and (4) where there was actually no enlargement of the gland. He remained unconvinced that thyrotoxicosis occurred in association with a thyroid gland which was normal in size or structure.

Aetiology and Treatment

After touching on the problem of the *forme fruste* type and of neuro-circulatory asthenia, the lecturer said that a discussion on aetiology did not come within the scope of his lectures. The enthusiasm with which he had urged operation in suitable cases was equalled by his fear lest a good operation might do a grave disservice when used for unsuitable cases.

The medical treatment of toxic goitre required no words from him. To say that iodine should never be administered except as a preparation for operation was to withhold a drug that could turn the scale in many patients, but at the same time their medical friends should be fair with the surgeon, for it had repeatedly happened that when a patient had been severely ill rest in bed and iodine had wrought a dramatic change, but the disease pursued its inevitable course and the patient ultimately died. On the other hand, some physicians had become so surgically minded in their outlook that it seemed to be left to the surgeon to point out what a field there was for the general

practitioner, who had the opportunity of seeing the first signs of temperamental change in a young patient whom perhaps he had helped to bring into the world.

As for radiation, the epithelium of toxic goitre was radio-sensitive, and he had seen good results maintained for some years in young patients and patients in the early stage of the disease. On the other hand, he had had 166 patients sent for operation after they had been given a full course or courses of *x*-ray treatment early in their lives, and of this number twenty-six had established fibrillation at the time they came for operation.

Lecture II ended with a few words on anaesthesia. Sir Thomas Dunhill's practice was to have a little premedication, with avertin following that, and under avertin the patient never knew she had left her bed. The neck could be injected early with local anaesthetic solution, and afterwards a little nitrous oxide and oxygen was grateful and comforting for operator and patient.

(To be concluded)

COMBINED ENGLISH UNIVERSITIES SEAT

SIR HENRY BRACKENBURY'S ELECTORAL ADDRESS

The following is the text of the address to the electors of the Universities of Durham, Manchester, Liverpool, Leeds, Sheffield, Birmingham, Bristol, and Reading by Sir Henry Brackenbury, M.D., LL.D., vice-president of the Association of Education Committees and Vice-President of the British Medical Association.

I have been invited to become a candidate for the representation of the Combined English Universities in the House of Commons, as one who is completely independent of all organized political parties. I believe that such a position is the most suitable one for a university representative, and I have for some years past not been a member of any such party. I am a firm believer in the national usefulness of university representation, but this cannot be justified or long continued if it is regarded as a refuge for parliamentarians without a seat or as a mere recruiting ground for those who are chosen by, and owe their main allegiance to, purely party political organizations. It must be remembered that the vote of a graduate, as such, is a second vote, and that he has an opportunity of giving his first vote on party grounds if he wishes to do so.

As a citizen I am not without views as to a number of political questions, but I have accepted candidature at this election because I believe that I could contribute something useful to the consideration of progress and reform in the fields of education, health, and what is called broadly social welfare. I am fully aware of the main problems which these fields present, and have had a somewhat wide experience of the organization and administration necessary for their effective solution.

Motherhood and Childhood

The main hope for the future of this country is the cultivation of childhood and the full development of all its immense potentialities. The chief care of the nation should be to help and encourage motherhood and to make it as safe as possible; and to secure for children, even from the pre-natal stage up to full adolescence, such a physical and mental environment as will permit of the development of a complete and many-sided personality. I appreciate the efforts which the present Government have made and are still making to these ends; but bolder, more continuous, and more co-ordinated efforts are required. A fuller and integrated scheme for a national maternity service is immediately necessary.

Education and the Teacher

Nursery and open-air schools should be further encouraged, and many of the older school buildings should be radically altered or replaced. The provision of playing fields, gymnasia, and swimming baths should be facilitated. Restrictive regulations on secondary school buildings, made when economy was urgently required, should be rescinded; in the planning of new schools, both elementary and secondary, due regard should be paid to the provision of suitable and sufficient dining-hall and kitchen accommodation. A larger proportion of specially qualified, trained, skilled teachers is required in most schools, not least in those for infants and junior scholars and for retarded children. The coming considerable fall in the number of children of school age should not be used for an immediate reduction in teaching staff, but rather as an opportunity for securing smaller classes and a higher proportion of teachers to children. It should be made possible for teachers to take their due share in public life. Some of these things cannot be effected at once or very quickly, but they should be the subject of definite plans to be accomplished within a relatively brief period.

Nutrition

The question of nutrition is even more urgent, and can, if there is the will, be more easily and rapidly dealt with. Considered broadly there is room for anxiety but not for alarm. There are no exact criteria by which degrees of nutrition can be measured, and therefore individual assessments may vary; but according to recent statistics the percentages of the elementary school population placed in each of the four categories officially recognized are: excellent 14.6, normal 74.1, slightly subnormal 10.6, bad 0.7. It should be remembered, however, that such arithmetical statements may be a veil which covers diversities of great importance, and the community ought not to rest satisfied so long as there are any under-nourished children in the country. Factors concerned with nutrition are many. Food is doubtless the most important, but sleep, atmosphere, sun, exercise, and psychological conditions of fear, distress, and unhappiness are others. All these require attention, but much could, and should, be at once accomplished by a wide and wise extension of the scheme for milk in schools, by a better method of providing and serving for midday meals in many schools, and by the continuation, where necessary, of these provisions over holiday periods.

Physical Training

The interrelationship between physical training and both nutrition and mental training is so close that they cannot properly be separated. I am in full sympathy with the proposals of the present Government in this regard. I was a member of the Executive Committee of the Central Council of Recreative Physical Training and of the Special Committees of the British Medical Association on Nutrition and on Physical Education, which have had so profound an effect in guiding public opinion and formulating policy on these questions. I hope that experience gained in these investigations and surveys might prove useful in the designing of practical measures for development.

Care of Health, Mental and Physical

The gaps still remaining in the continuity of care for children and young persons should be filled; and the permitted hours of labour of those who have entered industry shortened. The dependants of persons insured under the National Health Insurance Acts should be included in that health system, and some needed extensions and improvements of that service should be effected. Indeed, the time is ripe for the initiation of a comprehensive general medical service for the nation based upon the prevention of disease, the promotion of positive health, and the provision of skilled medical care and attention, both general and specialist, for those who are ill. Such a scheme should be established after full consultation with the medical profession. The need for the care of mental health, especially for those distressing conditions of fear, anxiety, obsession, and the like, both in children and in adults, which cause about one-third of the incapacitating illness of the country, is quite as great as that for attention to physique and to bodily ills. This has not received a sufficient degree of national attention.

Research

Biological, psychological, and medical research into many aspects of maternity, mentality, and educational methods, as well as research into various branches of technology and agriculture, should be more fully aided by the State, preferably under the auspices of the universities of the country.

Medical Education

If it be true that a well-educated and properly used medical profession is probably the best safeguard of the public health, the subject of medical education is of great importance both to that profession and to the public. I have been prominently concerned with more than one of the recent inquiries which have been made into this matter, and while I am convinced that most of the changes in the newly prescribed curriculum will tend to the improvement of what was already good, changes in medical science, social needs, and pedagogic methods are so rapid and significant that continued efforts are required to keep medical education fully adapted to the needs of the community. The interrelationship between the study of the preliminary sciences and general subjects leading up to the medical course and the work of the secondary and public schools is so intimate that there ought to be far closer consultation and co-operation between those responsible for these respective fields of study. This is true also in some degree in reference to engineering and to the application of science to industry.

Special Areas

All these things are matters of nation-wide interest; some of them are aggravated in the special or necessitous areas. More prompt and vigorous methods than have yet been used are required to meet the adverse conditions of these areas; and these should be mainly in the direction of industrial revival and establishment in their neighbourhood rather than of dispersal of their population.

Peace and the League of Nations

Peace and good neighbourliness among nations are essential if world disaster is to be avoided, and I hold that they can be successfully pursued not only through diplomatic channels and by the lowering of economic and trade barriers but by firm reliance on the League of Nations. The successes of the League in many spheres, even the political, have been far greater than is commonly supposed. Its major failures, as in the cases of Japan and Italy, have not demonstrated its futility, but have rather shown the way to greater effectiveness by some modification of methods.

Defence of Democracy

The defence, both material and cultural, of democracy has once more to be undertaken. I am prepared to support all such measures as are shown to be essential for such defence and for the safety of this country and of the British Commonwealth of Nations which are its chief exemplars, but the best justification and most abiding support for democracy will be found in assiduous attention to the health, education, and material and spiritual well-being and freedom of the people.

The second Conference on Industrial Physics will be held under the auspices of the Institute of Physics in Birmingham from March 18 to 20. The subject of the conference is "Optical Devices in Research and Industry." An exhibition of instruments, apparatus, and books cognate to this subject is being arranged, and will be held in the physics laboratories of the University of Birmingham. A section will be devoted to popular applications of optical devices, including photocells. The presidential address on "Spectroscopy in Industry" will be delivered by Professor A. Fowler, D.Sc., F.R.S. Visits to local works and research laboratories will be included in the programme. There is no conference fee and membership is open to all interested. Particulars may be obtained from the secretary, Institute of Physics, 1, Lowther Gardens, Exhibition Road, S.W.7.

Reports of Societies

AETIOLOGY AND DIAGNOSIS OF JAUNDICE

At a meeting of the Medical Society of London on February 22, Sir WILLIAM WILLCOX occupying the chair, a discussion took place on the aetiology and diagnosis of jaundice.

Dr. C. E. LAKIN, in opening, first made a reference to blackwater fever. This disease might occur in those who had suffered from subtertian malignant malaria and from whom the infection had not been completely eradicated. The actual attack might be precipitated by cold, overexertion, or quinine. Haemoglobin was liberated from the corpuscles so rapidly and in such large quantity that the cells of the reticulo-endothelial system were overwhelmed, and the urine was found to contain haemoglobin and the skin was deeply pigmented. Haemolytic pigmentation of the skin was also seen sometimes in cases in which transfusion had been carried out with incompatible blood. There did not exist any sharp line of demarcation between the haemolytic pigmentation of blackwater fever and incompatible blood transfusion on one hand, and on the other so-called haemolytic jaundice. Examples of haemolytic jaundice were those of pernicious anaemia, acholuric jaundice, malaria, Oroya fever, poisoning by potassium chlorate, sulphonal, or some snake poisons, and some cases of septicaemia. When haemoglobinuria occurred in the course of septicaemia the prognosis was thereby rendered more grave.

Toxic or hepatogenous jaundice included many conditions of diverse aetiology, a main feature being a retrograde change affecting the parenchymatous cells of the liver, so that they could no longer transmit the haemolytic products to the bile capillaries. In cases of toxic jaundice there was usually some splenic enlargement too. When widespread destruction existed the whole liver function was seriously impaired, and the fatal issue was preceded by pyrexia, persistent vomiting, haemorrhages, delirium, and coma. In obstructive jaundice there was a mechanical interference with the passage of bile from liver to intestine, and the digestion and absorption of fat was so defective that the total fat might form 50 per cent. of the stools. Constipation was the rule in this type, but occasionally diarrhoea occurred, ascribable to fermentative changes in the intestinal contents. For determining whether a patient was truly jaundiced only bright daylight should be used for the examination. In the obstructive form the conjunctiva was yellow, but not in haemolytic jaundice.

Differentiation of Type of Jaundice

Having decided that a case was one of jaundice the differentiation as to type was based on information yielded by the following: (*a*) a careful history, including details of family illnesses; (*b*) clinical examination of the patient; (*c*) *x*-ray and perhaps a cholecystographic examination; (*d*) a laboratory examination of blood, urine, and stools, including in this examination, perhaps, material obtained by duodenal intubation. Sudden jaundice in a healthy patient suggested obstruction of the common bile duct by gall-stone; a slow onset of jaundice, gradually becoming more intense, probably pointed to a new growth in the duct or pressure upon it from without. In a young adult painless commencement of jaundice preceded by evidence of gastro-duodenal catarrh suggested catarrhal jaundice; the indication was not so clear in those of maturer age. When the jaundice was preceded by loss of weight there might be present pancreatic disease, or malignant disease of the alimentary tract. A clue might be gained by inquiring into the kind of occupation followed by the patient. If the liver was palpable it should be determined, if possible, whether its surface was smooth or "hob-

nailed," and whether its bosses were umbilicated. If a liver was congested or hepatitis was present the organ would be tender. Efforts should also be made to find out whether the gall-bladder was enlarged. The supraclavicular fossa should be examined for any enlarged glands. Investigation of the heart should not be omitted, note being made of its size and any abnormal murmurs. It was noticed that in late stages of cirrhosis of the liver the first sound of the heart was of defective tone, and frequently the rhythm was of tick-tack character. When liver abscess was suspected the condition of the right base of the lung should be ascertained and a rectal examination should never be omitted in a case which presented difficulty. Bilirubin in the urine could be tested for by the iodine test or by the nitric acid test.

In obstructive jaundice the stools were putty-like, bile pigment was present in the urine, and the jaundice was more likely to be intense in these cases than in the haemolytic or the toxic groups. In the toxic form it was usual for the patient to be seriously ill, yet it did not follow that the jaundice would be very intense.

Investigation of cases of haemolytic jaundice should include a complete blood count, fragility tests, and a determination of the mean corpuscular volume, a count of reticulocytes and blood platelets, and the Wassermann test.

Laboratory Tests in Jaundice

Dr. GEOFFREY HARRISON (pathological department, St. Bartholomew's) spoke of laboratory tests in cases of jaundice. He said that bilirubin came third in numerical frequency—namely, after sugar and urea. The main chemical value of the van den Bergh test was to show the presence or absence of hyperbilirubinaemia when the patient had a slight yellow tint. In established cases its value was to enable one to follow the progressive changes in the concentration of the pigment in serum. A direct van den Bergh positive meant the presence of mechanical obstruction, but he thought the results of the direct test could not be properly interpreted until more was known of the chemistry of bilirubin and of the van den Bergh test.

He thought it would be agreed that the usual chemical tests for bilirubin in urine were not sensitive enough; the nitric acid and iodine ring tests were often negative when the jaundice was slight. A more sensitive test was an application of Fouchet's test to a barium precipitate from urine; that also depended on the oxidation of bilirubin to green biliverdin and blue cholecyanin. It did not give positive reactions in health, nor with pigments other than bilirubin. The investigation of the faeces should include a search for stercobilin, not for bilirubin. With regard to serum phosphatase, this was an enzyme which hydrolysed phosphate esters to liberate inorganic phosphate. It was widely distributed in the tissues, the greatest concentration occurring in bone, kidney, intestinal mucosa, liver, and red cells. In active bone disease and in obstructive jaundice the plasma phosphatase was increased.

The PRESIDENT referred to his toxicological work and to his war experiences with fatal cases of poisoning by the "dope" used for aeroplanes, and fatal cases following atophan, luminal, plasmoquine, acriflavine, and avertin. Trichlorethane was used largely in dry cleaning, and was very poisonous, while carbon tetrachloride produced atrophy of the liver. One of the main purposes of the liver was as a toxiphylactic agent. In toxic jaundice the key to the situation was the liver cell. Some people tolerated the large quantities of alcohol they were in the habit of taking because Nature provided fourteen times as much liver efficiency as was needed for ordinary requirements.

Dr. P. H. MANSON-BAHR said that anyone who shed fresh light on the cause of blackwater fever would do more to explain paroxysmal haemoglobinuria and acholuric jaundice than in any other way. In the former the quinine taken had much to do with the paroxysms. Since the advent of atebrin, which killed the subtertian parasite, blackwater fever as a catastrophe in this country had practically died out. One means of curing that disease was by giving large quantities of fluid. He expected to see plasmoquine and carbon tetrachloride taken off the black list of drugs. The latter might cause toxic jaundice, as did chloroform, but it would be wrong to ban it on that account; and the former had never, to his knowledge, caused jaundice. Dr. Lakin had mentioned amoebic hepatitis and amoebic dysentery as causes of jaundice, but amoebic abscess was a condition that was not associated with jaundice.

DANGERS OF INFECTED MILK

At a meeting of the Section of Medicine of the Royal Society of Medicine on February 23, with Sir CHARLTON BRISCOE in the chair, the subject of discussion was milk as a factor in the cause of disease.

Infection of the Cow

Dr. W. G. SAVAGE (medical officer of health, Somerset), in opening, divided the subject into two groups—namely, human infections associated with infection of the cow, and diseases spread through human infection of milk. Dealing first with tuberculosis, he referred to an inquiry which he had made in 1931, the result of which was to suggest that during that year the deaths due to bovine tuberculosis in this country numbered 1,731. He believed that out of an anxiety not to overstate the case the figure was really an underestimate. Recent years had shown that the proportion of pulmonary tuberculosis of bovine origin might be considerably higher than the earlier figures suggested. He thought the conclusions of the People's League of Health Committee might be accepted as a minimum statement, that in England and Wales about 6 per cent. of all deaths from tuberculosis were caused by the bovine type of bacillus. About 4,000 fresh cases of bovine infection developed each year. The proportion of cows suffering from tuberculosis of the udder was about 0.2 per cent. The proportion of raw milk containing living tubercle bacilli varied widely in different parts of the country, but a fair average was 5 or 6 per cent.

Turning to undulant fever Dr. Savage discussed the available evidence as to the presence of contagious abortion in dairy cattle. Raw milk samples contained *Br. abortus* in from 8 to 10 per cent. of cases, and these applied equally to high-class milks. Various estimates had been made as to the number of cases of undulant fever in man, but it was evident that man was not readily infected with *Br. abortus*, possibly owing to a measure of latent immunity or other factors not yet ascertained. Certainly the number of cases of infection in man was relatively small as compared with the wide prevalence in dairy cattle and the opportunities for human infection thereby afforded.

He touched next upon streptococcal infections. Mastitis in both acute and chronic forms was one of the commonest infections of the cow, but human infection from this source was very rare. In cows mastitis was nearly always due to a streptococcus of a strain non-pathogenic to man. A point to be remembered was that streptococci from human beings might produce a local infection in the udder of the cow and so contaminate the milk supply. Only human streptococcal infections of the udder were infective to man, and these outbreaks might be of considerable importance because they were so widespread. Dealing next with Salmonella infections in the cow, he said that outbreaks which were clinically acute food poisoning with milk as the vehicle appeared from time to time and in most cases could be traced to a certain cow. He had particulars of twenty outbreaks, and a tabular statement of eight of them showed the numbers affected to be from 110 to 523 in individual outbreaks. The mortality rate was low.

Human Infection of Milk

Turning next to disease spread through human infection of the milk, Dr. Savage discussed diphtheria, scarlet fever, typhoid and paratyphoid fever,, and dysentery. In the recent report of the Cattle Diseases Committee there was a list of milk-borne outbreaks occurring during the period 1900–31 which happened to be known to the Ministry of Health, but many outbreaks though recognized as due to contaminated milk were not reported.

The list mentioned included fourteen outbreaks of diphtheria, twenty-eight of scarlet fever, thirty of enteric fever, four of typhoid fever and dysentery, and seven of paratyphoid fever. In the United States the outbreaks were more systematically recorded or were more numerous. He also gave examples of the recent (1936) very extensive outbreak of enteric fever in Bournemouth and Poole, mentioning that some of the later cases arose even within his own area in Somerset. In the Chelmsford outbreak in 1935 there were 487 notified cases and about 2,000 cases of illness, with six deaths.

He concluded by saying that the evidence that milk served as a vehicle of infection was overwhelming. As regards tuberculosis the extent of the disease so spread could be estimated with reasonable accuracy and constituted an amount of infection which was a standing disgrace to the legislature, since the remedy was known, not difficult of application, and was only prevented from being applied by considerations which should not be allowed to weigh against the proved damage caused. In the case of undulant fever an estimate of the damage was gradually being reached, and with regard to other milk-borne infections the evidence showed that these were far from being negligible.

Incidence of Br. Abortus Infection

Professor F. S. MINETT (Royal Veterinary College) said that at the Royal Veterinary College a good deal of work had been carried out on *Br. abortus* infection and the incidence of this organism in milk. The incidence could not exactly be stated ; it depended on a number of different factors, such as the amount of milk tested, the number of guinea-pigs injected, and the technique used for examination. It appeared as though clean milk was very much more heavily infected with *Br. abortus* than ordinary milk. It was evidently more easy to isolate the organisms from milk which was clean than from milk which was dirty. Further work, however, showed that it was not the bacterial flora in the milk that was causing the difficulty in the isolation of *Br. abortus* but rather the incidence of the tubercle bacillus in the milk samples. When there were put into the guinea-pig at the same time the tubercle bacillus and *Br. abortus* it often happened that the latter could not be isolated.

With regard to streptococcal infections which were milk-borne Dr. Savage had referred to the hypothesis that streptococci originating from human beings might produce a local infection in the cow's udder and so contaminate the milk supply. This hypothesis had received a good deal of support from observation and experiment—so much support, indeed, that it could not be doubted that it was correct. Streptococcal mastitis was very common in cows, and so far as it was due to haemolytic streptococci it might be said that the form of mastitis due to weakly haemolytic streptococci was of no importance from the point of view of human health, but another group in which the disease was caused by the active haemolytic streptococcus deserved to be considered further in that connexion. The contamination of milk must be either direct from human beings or "indirect" from the cow, and it seemed to him that all the evidence pointed to the fact that infection of milk was indirect and via the cow. The evidence which supported such indirect contamination of milk could be discussed as epidemiological, cultural, and the evidence directly concerned with the animal. These widespread and continuous epidemics in human beings could scarcely be due to casual or intermittent contamination. With regard to the second point it was not easy to say whether the streptococcus grew in the milk or not. It was necessary to consider the strain of the streptococcus used, whether recently isolated or a fairly old cultural strain, the number of streptococci in the milk, and the atmospheric temperature at which the milk was stored. The results of the investigation indicated that *Streptococcus pyogenes* would grow in sterilized milk slowly ; in pasteurized milk the organisms would not grow or would grow only extremely slowly and after a good deal of lag.

The Doncaster Epidemic

He proceeded to speak of the epidemic of scarlet fever at Doncaster in December last, some account of which was given in the *British Medical Journal* of January 2 (p. 26). This epidemic involved 268 people, of whom three died. The cases were found to be connected with the milk supply from one farm, which was immediately stopped. Most of the cases started on December 10, 11, and 12. He was permitted to mention some of the findings of Dr. F. Griffith of the Ministry of Health. On December 15 it was proved that the cases of scarlet fever were due to a Type II scarlet fever organism. On December 16 mixed samples of milk from groups of cows on this farm were examined, and from one of the groups —a group of four cows—some organisms were obtained. The next examination was made on December 20, and the four cows belonging to this group were examined. From one of them again Type II scarlet fever organisms were isolated. On December 30 milk samples were examined from all the thirty-one cows in this herd and from one cow scarlet fever streptococci were obtained and subsequently shown to be of Type II. The organism was not found in any of the other cows.

The speaker showed a photograph of this cow. He found scarlet fever streptococci Type II in it on January 6, 23, and 28. These organisms, however, were only forthcoming from the left-front quarter of the udder, whereas Dr. Griffith had previously found them in both the right and left front quarters. The herd had been examined by a veterinary officer on December 15, from three to five days after the bulk of the human cases occurred. On that date the cow was practically normal as regarded her health. There was some induration of the right front quarter. Not until December 20 was there an actual mastitis in that cow.

Human Infection Transmitted to the Cow

Dr. W. McD. SCOTT (Ministry of Health) said that in addition to the two groups of infections mentioned by Dr. Savage—namely, human infections associated with an infection of the cow, and diseases spread through human infection of the milk—there was a third group in which diseases normally affecting man were transmitted to the cow, and resulted in the presence of the infecting agent in its milk. Enteric fever might, though rarely, be a bovine infection, and a cow suffering from it might then transmit the disease in its milk. One reason for suspecting this sequence of events—namely, human infection of the cow proceeding to infectivity of milk, was the degree of infection. Droplet infection, or direct contamination from a milker or milk-handler, could scarcely produce disease in so large a proportion of human consumers. One outbreak of enteric fever of over 1,000 cases was traced to a single milk supply. It was discovered that the cows had as their drinking place a small river into which, a few hundred yards upstream, a sewage effluent was discharging, and when this was examined it was found to contain enormous numbers of typhoid bacilli, some hundreds per cubic centimetre. It was possible, and even likely, that the cows during drinking and wading in the stream acquired surface contamination of their legs and udders, and equally likely that this contamination might be conveyed to the milk in spite of the regular washing of the udders before milking. But it seemed improbable that such an accident could occur every day throughout

the whole of three weeks and provide each day a fully infective dose, especially when one considered the great dilution which must have resulted from bulking the milk with that of other farms; and the same principle seemed to attach to the idea that typhoid bacilli ingested by the cows would survive in the alimentary canal and be discharged in the faeces and in sufficient doses contaminate the milk. Was it possible that a cow ingesting sewage contaminated with enteric fever could itself become a profuse source of these bacilli? It was most regrettable that it was too late to get direct proof in this instance.

Need for a Safe Milk Supply

Dr. C. O. HAWTHORNE said that the first impression formed in the mind of anyone listening to that discussion must be the seriousness of the indictment which had been brought against milk as the agent responsible for diseases in human beings. Was there any other subject on which there was so decided and unanimous an opinion as the proposition affirmed by the three speakers they had already heard? Public opinion was not thoroughly informed on this subject. There were indeed direct challenges in the public press to the facts and conclusions which had been brought forward that day. A letter recently appeared in the *Times* written by a Member of Parliament challenging the figures in regard to deaths from bovine tuberculosis, and stating that instead of 2,500 or 3,000 cases of fatal bovine tuberculosis per annum there were not more than 500. It was true that there had been an authoritative statement in reply by the President of the Royal College of Physicians, but the particular figures brought forward had not been challenged, as they could only be, by experts in this subject. The education of public opinion had been conducted to come extent, but it still remained true that innumerable school children were receiving raw milk as part of the school regime. He urged that experts should not be content to remain in academic seclusion, and when they saw statements in the Press which challenged the position they had verified they should come down into the arena and show the scientific foundation for the argument which the medical profession had adopted—namely, that milk might be clean, but might still be unsafe, and that in order to make it safe it had to be treated by some heat process.

Mr. TOM HARE rose to suggest that as practical men and veterinary scientists they should keep a sense of proportion in this matter. He considered that there was a great deal of exaggeration in such a speech as Dr. Hawthorne had just made. He hoped that account would be taken of the fact that the veterinary services of the country had considerably reduced the incidence of tuberculosis in dairy cattle, and he suggested that the leaders of agriculture as well as of the veterinary profession in this country were not doing any disservice when they emphasized the importance to health of the consumption of a clean raw milk by the community.

Mr. STEELE BODGER also considered that the "milk-borne epidemic" theory was being overdone. By the adoption of pasteurization of milk the disease problem was being attacked from the wrong end. All this talk was giving a false sense of security. A safe raw milk could be produced if the community was prepared to pay for it. As one interested in clean milk production from the veterinary point of view he knew of nothing which was more calculated to encourage slovenly production of milk than the knowledge that it was going to be pasteurized. The dirtiest milk in the Midlands came to London because it was known that here it would be pasteurized, and thus it was thought it did not matter. He begged those concerned not to hide their heads like ostriches and imagine that in pasteurized milk they had a panacea for all milk ills.

Dr. J. F. BROCK said that the discussion had emphasized the importance of the medical profession not only understanding the position with regard to milk-borne diseases but also using its information for the benefit of the public. Members of the profession, particularly those associated with any form of scientific research, were averse to being regarded as propagandist, but sometimes in their detachment they did forget their responsibility for educating the public. There was clear evidence that milk was an important factor in the dissemination of disease, and the public must be informed as to the best means of preventing disease arising from this source. Undoubtedly the production of a pure milk supply was one of the most important factors, but were they in the meantime to allow the dissemination of disease to go on constantly because they were not prepared to purify their milk on the spot?

Dr. RICHARD HAMBURGER mentioned that in Germany the medical profession and the consumers had decided not to use any kind of milk other than boiled, and the profession there was of opinion that there was no difference between the feeding results with raw and with boiled milk. Dr. E. WHITE considered it necessary to add to what had just been stated that in Germany measures were taken to ensure cleanliness of the milk before boiling. With regard to medical men coming into the arena and expressing their views in the Press, he said that they were naturally hesitant of so doing because of the tendency of the Press to publish only extracts from communications, which might give a wrong impression. Dr. R. P. WILLIAMS mentioned an epidemic of scarlet fever in a sanatorium due to infection carried by one man in the attached dairy; the trouble might have been obviated by pasteurization. Dr. SAVAGE, in his reply, took up the question of the Montreal typhoid epidemic, which had been attributed by one speaker to pasteurized milk. He denied this, saying that the milk in question had not passed through the pasteurizing process.

EPIDEMIOLOGY OF WEIL'S DISEASE

At a meeting of the Section of Epidemiology and State Medicine of the Royal Society of Medicine on February 25, Surgeon Rear-Admiral S. F. DUDLEY, R.N., presiding, Dr. J. M. ALSTON and Major H. C. BROWN brought forward a communication on the epidemiology of Weil's disease.

The authors stated that this disease was defined as a clinical entity by Adolf Weil in 1886. The name "Weil's disease" was then applied to many cases of infective jaundice, but so long as there was no description of the specific anatomy of the condition nor any discovery of specific cause there was always considerable doubt as to the applicability of the name in individual cases. In 1915 Professor Inada of the Imperial University of Japan described a form of spirochaete as the causal organism of the disease. This was now known as *Leptospira icterohaemorrhagiae*, and Professor Inada's work was confirmed by Hubener and Reiter in Germany. The disease was found extensively among the coal miners and field workers in Japan. The illness took the form of fever, conjunctival congestion, jaundice, haemorrhages in various parts, and muscular pain, and there was a marked effect on the kidney as shown by albuminuria. These discoveries and confirmations about 1915 were facts which put Weil's disease in a definite and well-identified position, and it was since that time that the most important information from the epidemiological point of view had been collected.

The distribution of the infection was nearly world-wide. The countries with highest incidence were Japan, the Malay States, Netherlands East Indies, Holland, and France. In contrast to these areas of high concentration there were some in which the disease had not been established—namely, Egypt, Persia, and India. Strong sunlight had a damaging effect on the organism, and possibly this accounted for the relatively low incidence in those countries. It was clear that with improved methods of detection many more cases of the disease were being found. In the British Isles between 1922 and 1933 there

were only four cases recorded, but during the last three and a half years, with better methods of detection, it had been possible to trace 142.

Sources of Infection

In most parts of the world rats and some other small rodents harboured the organism and excreted it in the urine. This was almost always the direct or indirect source of infection of man, but natural infection of dogs and foxes took place, and was at least a potential danger to human beings. The degree of infection was greatest in rats of intermediate age, and less in the younger and older animals. Dogs not only suffered from an illness, but could to a certain degree act as carriers without evident infection. There was a hint that possibly pigs might be a danger. In Germany there was a well-authenticated instance of a butcher developing the infection eight days after slaughtering a very jaundiced pig. The organism appeared to lead a precarious life outside the animal body. It quickly died in an acid medium, in strong sunlight, and in salt water.

Infection was usually related to occupation in coal mines, field work of all sorts, sewers, fish-cleaning, and to bathing in fresh water. The route of infection was usually by contact of the abraded or sodden skin with infected mud or water, but infection might take place by imbibition of water and by the bites of rats, dogs, and ferrets. The question of oral infection had been stressed in Holland, where cases had arisen in people who had fallen into the canal and involuntarily swallowed the water. Men were much more exposed to infection than women, except fish-cleaners, among whom the incidence was equal in both sexes.

Incubation and Incidence

The incubation time might be from four to nineteen days, but usually it was from seven to thirteen days. The fatality rate was considered in the earlier investigations to be very high, because at that time there was no knowledge of the mild, latent, or subclinical infections. When these were taken into account the mortality was seen to be much lower. Among the 142 cases recorded in the British Isles during the last three years and a half the mortality rate was 15 per cent. By serological methods many subclinical infections without jaundice could be detected among people who were often at risk.

Finally, Dr. Alston gave a table of the occupations of the persons concerned in the 142 authenticated instances from July, 1933, to the present time. Of these, forty-five were fish-workers, all at Aberdeen, and there were three deaths in this class. Only one other case of a fish-worker was recorded—namely, in the Isle of Man, a non-fatal case. There were twenty-nine cases among coal miners in Northumberland and Durham, with six deaths, and five cases among coal miners in other fields, with no deaths. Among sewer workers there were nineteen cases with five deaths, all in London. The cases which followed fresh-water bathing numbered fifteen, with two deaths, and occurred in various parts of the country. The other occupations or circumstances, numbering seventeen, mostly showed single cases. There was one instance, in London, of a laboratory infection. In all these circumstances there were three factors: the presence of rats harbouring and excreting the organism, surrounding dampness helping to maintain the organism's viability, and liability to abrasions of the skin among those engaged in the particular work. One of the means of prevention was to block up imperfect and unused drains, and so stop the access of rats to the sewers, and, on fish-curing premises, to practise methods of rigid cleanliness so that rats were not attracted to the offal.

Discussion

Dr. H. J. PARISH remarked that in view of the huge rat population of this country it was rather puzzling that there were not more human cases. He also asked a question with regard to laboratory infections. Was there such a risk of, say, a fragment of guinea-pig liver which had been mashed up getting into the conjunctiva as to make it desirable for laboratory workers to wear protection for the eyes? Dr. J. D. ROLLESTON referred to incomplete forms of the infection, to which there was a parallel in the *forme fruste* of the acute exanthemata which had no rash, or of poliomyelitis which had no paralysis. There had lately been published in France an account of special localization of leptospiral infection in the meninges, giving rise to a mysterious form of meningitis; there had also been a few such cases in Holland. Apparently it occurred in just those occupations—sewermen and scavengers, with the addition of well-sinkers—which were most often affected by Weil's disease.

Dr. C. F. WHITE, medical officer of the Port of London, said that so far no cases had been known to occur in the port, but he was sending some live rats from the docks and ships for investigation to ascertain whether they harboured the leptospira. It should be remembered, however, that docks and ships were now more free from rats than most shore premises. Dr. J. E. MCCARTNEY said that on the Western Front during the war a number of cases of leptospiral jaundice were found. The route of infection was thought to be sodden skin rather than abrasions. Some cases were found in rat-infested dug-outs where there was no moisture, and it was believed these were due to alimentary ingestion of the parasite. Mr. GRAHAM, a layman concerned with the construction of sewers, asked whether there was evidence that this disease was of recent introduction. Until the last four or five years nothing was heard about it so far as sewer workers were concerned. Hitherto the health of sewermen had been rather a matter of pride.

Dr. A. JOE mentioned that the first case of the disease he saw was in Edinburgh in 1923 in a man working in the grain store of a brewery. Dr. J. ALISON GLOVER referred to the absence from the list of cases and occupations of workers on refuse dumps. Was this immunity due to exposure to the air and relative dryness? He also asked whether the black rat was as susceptible as the brown. Dr. E. W. GOODALL remarked on the curious fact that practically all the cases among fish-curers occurred at Aberdeen. Yet it was said that the organism died quickly in salt water. Dr. PERCY STOCKS asked whether the term "rat-bite fever" was a sufficient description of the disease. What was the best title for international use? A committee was now sitting on the revision of the international list of causes of death, and was proposing to give a separate number to this disease. It was not considered desirable to attach a man's name to a disease on account of the controversy which ensued at international conferences!

Major H. C. BROWN said that with regard to nomenclature, if it was not to be called Weil's disease he thought the most appropriate title would be "spirochaetal jaundice." The expression "infective jaundice" should be avoided on account of confusion with "infective catarrhal jaundice." "Rat-bite fever" was a totally different disease due to another organism. The brown rat was distinctly more susceptible to the disease than the black. With regard to the meningeal form, he had heard about the cases in France, and a French investigator had told him that a curious agglutination reaction was obtainable in these purely meningeal forms. In such forms a positive reaction was never obtained at 1 in 10 dilution; that dilution was almost invariably "skipped." With regard to the possibility of conjunctival infection in the laboratory, he was certainly of opinion that glasses should be worn. As to the relative rarity of cases considering the huge rat population and the opportunities for infection, the chances against infection had to be remembered. Not only must the infecting organism be present, but also an abrasion of the skin. Otherwise, unless it entered by the conjunctiva or nasopharynx, the chances of evading infection were very great.

OESTRIN IN BLOOD AND URINE

At a pathological meeting of the Liverpool Medical Institution on February 18, with the president, Professor R. E. KELLY, in the chair, Dr. O. VAUGHAN JONES read a paper on the oestrin content in blood and urine, its estimation and clinical application.

Dr. Vaughan Jones said that within recent years the estimation, detection, and analysis of oestrogenic substances had been the subject of wide research. The chemistry of this group of substances was now for the most part known, and already the physiological and therapeutic possibilities of these hormones were being realized. In the non-pregnant woman the Graafian follicle was the chief factor elaborating oestrin, and its concentration varied according to the stage of ripening of the follicle, while in pregnancy it was the placenta that produced vast quantities of the hormone. During pregnancy large amounts were found in the blood, there being a continual rise in concentration, well marked during the second half of pregnancy.

The estimation of oestrin in the urine during pregnancy was complicated by the fact that about 90 per cent. of it was excreted in the "combined" form. After the third month there was a rapid rise in the amounts of "combined" form excreted, this rise being more marked after the sixth month. The concentration of the "free" form of oestrin in the urine was low throughout pregnancy, but shortly before parturition the amounts of the "free" form rapidly increased.

Clinical Applications

The application of these laboratory findings was of paramount importance, as oestrin must vary in concentration in health and disease. Its estimation in cases of menstrual disorders, such as amenorrhoea, metropathia, and at the menopause, might be useful to the diagnosis and prognosis of the case in question. With the vast amounts of the hormones produced during pregnancy it would be expected that any upset of normal production would result in a change in the hormone balance in blood and urine. When the foetus died *in utero* there must be a complete upset in their formation and excretion. The various tests for these hormones should therefore be significant in ascertaining the viability of the foetus.

The Aschheim-Zondek test was a test for the viability of the placenta and not of the viability of the foetus. When the foetus died *in utero* the Aschheim-Zondek test could be, and often was, positive, this being probably due to the retention of some active chorion epithelium which maintained the production of prolan. Thus the Aschheim-Zondek test was unreliable as a test for intra-uterine death of the foetus. It had now been generally agreed that the placenta produced oestrin as well as prolan. On this assumption it seemed likely that the death of the foetus, which entailed the interruption of the placental circulation, might have an influence upon the hormone level in the blood.

It had been found that the blood oestrin content fell to a low level in these cases. On this fact had been based a test for the viability of the foetus, whereby the oestrin present in blood was extracted with ether and the extract tested biologically. A series of such cases was examined.

No.	Cases of	Blood Oestrin	Subsequent History
35	Normal pregnancy	Positive	Pregnancy continued
12	? Missed abortion	Negative	Macerated foetuses delivered
29	? Intra-uterine death	23 Negative	Macerated foetuses
		6 Positive	Foetus alive

From these cases it was concluded that the blood oestrin test was a valuable and reliable test for the viability of the foetus, and could be done as soon as the death of the foetus was suspected. It must therefore be recognized as a test of the utmost importance. When the urines of these women were examined it was found that there was no great difference between the "total oestrin" of normal pregnancy urine and that observed in urines from women carrying a dead foetus.

In the discussion which followed the PRESIDENT said that real standardization would only come when these fascinating compounds were crystallized in pure form and weighed. He was interested in the methods of analysis and the relation of oestrin to the carcinogenic substances.

Pathological Specimens

Several pathological specimens were shown at the meeting, among which were two demonstrated by Dr. T. F. HEWER. The first was a case of spontaneous fracture of the humerus with carcinoma of the prostate. A man of 75 with carcinoma of the prostate had a spontaneous fracture of his humerus, as a result of extensive carcinomatosis, four months before death. There was shortening of the bone, but firm union had taken place between the adjacent surfaces of the overlapping segments. It was surprising that the carcinoma cells did not invade the traumatized zone, in the manner of a tissue culture, and prevent union of the fracture. The second was a case of megakaryocytic myelosis with osteosclerosis. A man of 59 had a history of splenomegaly and increasing weakness for ten years. His blood picture was one of secondary anaemia with leucopenia. The other clinical pathological findings were essentially negative, and a clinical diagnosis of splenic anaemia was made. At necropsy the spleen was found to weigh 2,100 grammes, and to contain many small tumours, which consisted of bone marrow with great numbers of megakaryocytes; the splenic pulp and sinusoids were full of primitive marrow cells. There was no myeloid infiltration of the other organs. The marrow cavity of the upper third of the femur was almost completely obliterated by spongy bone, but this was diffusely infiltrated with hyperplastic marrow. The marrow in a vertebra was hyperplastic without any sclerosis. This was the condition described by Emile-Weil and other French writers under the name of *splénomégalie myéloide mégacaryocytaire amyélocythémique*. It appeared to be a reticulosis which had differentiated at the stage of haemocytoblasts and megakaryocytes, and was not capable of producing the requisite number of adult cells. The presence of osteosclerosis in the femur without a leuco-erythroblastic blood picture was interesting.

The first annual meeting of the Voluntary Euthanasia Legalisation Society was held in London on February 25, with the president, Lord Ponsonby, in the chair. The president said that there was no need for the society to be discouraged by the rejection of the Voluntary Euthanasia (Legalization) Bill in the House of Lords. He explained that the opposition to the Bill had been mainly on questions of principle. He paid tribute to the work done for the society by its first president, the late Lord Moynihan. The annual report of the society stated that this country was the pioneer in voluntary euthanasia, with no precedent to follow. The total membership of the society is 268 (including fifty honorary members). Seventy medical practitioners are members.

The Queen has graciously been pleased to retain her appointment as Commandant-in-Chief of the Nursing Corps and Divisions of the St. John Ambulance Brigade. Her Majesty, who is a Dame Grand Cross of the Order of St. John, has always taken a keen and active interest in the work of the Brigade, and has held her present appointment since May, 1928. There are 897 nursing divisions in the St. John Ambulance Brigade with a personnel of 19,659 nursing officers and sisters.

Local News

ENGLAND AND WALES

Amalgamation of Bristol Hospitals

At a meeting held on February 23, with Colonel P. G. Robinson, president, in the chair, the governors of the Bristol Royal Infirmary gave the committee power to amalgamate that institution with the Bristol General Hospital. This proposal had already been approved by the committee of the General Hospital, and the governors of that institution will be invited to confirm it at a special meeting on March 15. The resolution adopted on behalf of the Royal Infirmary on February 23 makes provision for central administration of the two hospitals, the pooling of funds and finance, the formation of one joint honorary medical staff, and such centralization of functions as may be agreed upon. Professor Rendle Short, who seconded the resolution, said that this had in the first place gone before a united meeting of the medical staffs of both institutions a few months ago and had been passed unanimously.

New Dental Hospital for Manchester

At the annual meeting of the governors of the Manchester Dental Hospital on February 26 Professor J. S. B. Stopford, vice-chancellor of the University, announced that Mr. Samuel Turner of Rochdale had offered to defray the cost of building a new dental hospital and school. Three years ago Mr. Turner made a gift towards the establishment of a chair of dental surgery, and he has contributed annually to its maintenance. The vice-chancellor was not able to announce the proposed site for the new hospital or the estimated cost of the scheme. He said, however, that a start might be made on the new building in October. Included in the hospital will be a children's clinic, a special department for the treatment of pyorrhoea and other chronic infections of the mouth, and full facilities for research work. Professor Wilkinson, director of the hospital, pointed out that since 1910 the number of patients treated each year had grown from 20,000 to nearly 40,000. The Manchester Dental Hospital is the only one of its kind in East Lancashire, and receives patients from a very wide area. In appreciation of Mr. Turner's gift Professor Stopford said: "It is impossible to measure its value to the city, the neighbourhood, dental education, and the advancement of dental science. Mr. Turner realizes that dentistry is of fundamental importance in the domain of preventive medicine, and I trust that his gift may awaken others to this fact."

District Nursing in London

The annual meeting of the Central Council for District Nursing in London was held at County Hall on February 25 under the chairmanship of Sir William Job Collins. The business was formal, chiefly concerned with the adoption of the annual report. The amount which the central council received during the year by grants from trustees of charities, subsidies from the London County Council, and a certain number of donations amounted to just over £11,000, and a similar sum has been distributed among the more than eighty affiliated district nursing associations covering the metropolitan area, which extends far beyond the county of London. The outstanding grant was one of £4,000 from the trustees of the London Parochial Charities for services rendered during the year, to which the trustees added another £500 for general purposes. It was reported that the scheme for home nursing of persons coming within the scope of the public assistance department of the London County Council, which has now been in operation for four years, was progressing, and that under the scheme 181,513 visits were paid to 5,324 cases last year. The question of the considerable number of such cases, especially in East End districts, which need nursing visits for the insulin treatment of diabetes has been settled by the London County Council for two years on the basis that the payment made by the Council should be at the rate of 6d. for each "insulin visit"; previously such visits had counted for grant as half-visits. There were 24,000 such visits during each quarter of the year that the scheme has been in operation, and it is anticipated that the total payment by the London County Council for these "insulin visits" for the year 1936–7 will be £2,300. A new provident scheme has been launched for the district nursing of Greater London, and on the preliminary committee the central council was invited to appoint two representatives. The executive, however, decided not to express an opinion before ascertaining the views of its affiliated associations. On this being done, eighteen associations, employing 154 nurses, were found to be in favour of the scheme and thirty-four employing 227 nurses, against. It was decided, therefore, that the central council should not be associated with the scheme. It is understood that the scheme is proceeding. It was mentioned that the first distribution to district nursing associations by the King Edward's Hospital Fund was made in April last, £2,000 being distributed among 109 district nursing associations. This allocation was made in response to representations from the central council. An executive committee of thirty members was elected from the meeting. Sir Comyns Berkeley and Dr. W. Paterson, two of the three British Medical Association representatives on the central council (the third being Dr. Mary Blair), were appointed on the executive, the chairman of which is Sir Francis Morris and the vice-chairman Sir Stanley Woodwark.

Medical Candidates for the L.C.C.

The results of the triennial election for the London County Council will not be completely known until midday on March 5; but it is satisfactory to note that there is a very strong list of candidates drawn from our profession. Newcomers include Dr. Doris Odlum, who is standing for North Hammersmith in the Municipal Reform interest; her special experience should make her a most valuable member of the Mental Hospitals Committee if she secures election, but the constituency is not an easy one to contest, and it will be a feather in her cap if she succeeds. Dr. E. A. Whitfield is a Labour candidate for North Paddington, for which he has quite a possible chance of election. Dr. R. F. B. Bennett is standing as M.R. candidate for East Woolwich. All the other medical candidates are members of the expiring council. They include Dr. J. A. Gillison (Lab.) for Bermondsey (Rotherhithe); Miss E. Rickards, F.R.C.S. (Lab.), for Greenwich; Dr. B. Homa (Lab.) for Central Hackney; Dr. S. Monckton Copeman (M.R.) for Hampstead; Dr. Henry Robinson (M.R.) for North Kensington; Dr. S. W. Jeger (Lab.) for Shoreditch; Dr. C. W. Brook (Lab.) for North Southwark; Mr. Somerville Hastings, F.R.C.S. (Lab.), for Stepney (Mile End); Dr. F. Barrie Lambert, C.B.E. (M.R.), for Westminster (St. George's); and Dr. S. McClements (Lab.) for West Woolwich. The superstitious may note that the total is thirteen; it is probably too much to expect that all will be elected, but it is clear that most of them will be, to the advantage of London as a whole.

Growing Demand for Hospital Almoners

At the annual general meeting of the Institute of Hospital Almoners, held at the Westminster Palace Rooms on February 25, when Sir George Newman gave the address, a very successful year's work was reported. The great need for more almoners to fill the posts which are rapidly materializing was stressed. The number of students in training at present is the highest on record, but the number of new posts also grows, and there are not enough almoners to meet the demand. The Executive Council reported that during last year four opportunities of opening new departments were lost and two established

posts passed to untrained workers because of the scarcity of almoners. The demand for almoners is now coming even more urgently from hospitals out of London than from those within the metropolitan area. In London in 1935 there was a preponderance of appointments owing to the action of the London County Council, which during that year opened an almoner's department in each of its general hospitals. During 1936, of the fifty-nine posts of almoner or assistant almoner filled, twenty were in London and thirty-nine out of London. It was also stated that although the majority of the appointments are still made by the voluntary hospitals the number of county and municipal health committees employing almoners is increasing. Public health authorities enjoy considerable latitude as to the methods by which they work, and the duties of an almoner in a municipal or county hospital are varied to suit the requirements of the area. The appointment of almoners to these hospitals is in many cases still in the experimental stage, but the institute considers that it has been proved that there is a place for hospital social service no less in the municipal or State hospital system than in the voluntary. Some account was given to the meeting of the training required for the institute's certificate. The public health and public assistance authorities of London, Liverpool, Leeds, Manchester, Middlesex, and Surrey now admit students to their hospitals for part of their training. Mention was made of the fact that the institute has become a tenant in the building of the British Medical Association, and the new accommodation has made possible an increase in its activities, particularly in regard to its library. It was announced that Sir Farquhar Buzzard had consented to continue in office as president for a second period of three years.

SCOTLAND

Glasgow Royal Infirmary

A new nurses' home is to be added to the Glasgow Royal Infirmary at a cost of over £100,000, which will be met by a contribution from the Lipton Trust, as a memorial to the late Sir Thomas Lipton. The new home will contain 250 bedrooms, with the necessary rooms for reading, writing, private study, and recreation. A tenement has been removed between Provand's Lordship and the Cathedral Halls, the site of the new building. The annual report of the Infirmary shows that the number of patients treated in the wards last year was 18,416, with an average daily number resident of 849. In the out-patient department 119,914 patients received treatment, the attendances totalling 375,234. At the ophthalmic institution there were 752 in-patients and 15,890 out-patients. The ordinary revenue fell short of expenditure by £24,459, but this deficit was met out of legacies and large donations amounting to £50,655. Subscriptions totalled £28,773, and there was an increase of over £2,000 in the subscriptions from organized employees and wage-earners. At the end of the year special sums amounting to £19,710 were received from the estates of Miss Margaret and Mr. William M'Ghie to be devoted to cancer research, and these sums are to form the nucleus of a cancer research fund.

Bicentenary of Edinburgh Royal Medical Society

In celebration of the bicentenary of Edinburgh Royal Medical Society, which was founded in 1737, a dinner was held in the North British Station Hotel, Edinburgh, on February 25. Dr. A. G. Ross Lowdon, the senior president, took the chair and some 250 members of the society and guests attended, including Dr. Robert Hutchison, Sir Auckland Geddes, Sir Thomas Holland (Principal of the University), Professor W. T. Ritchie (President of the Royal College of Physicians), and Mr. Henry Wade (President of the Royal College of Surgeons). Dr. Robert Hutchison, who was the chief guest and a former president of the society, in submitting the toast of "The Royal Medical Society," said that if the half-dozen obscure students to whom the society owed its birth could look down upon them from the Elysian fields they would be surprised to find that the seed which they had planted had grown into a tree which had braved the centuries. All the chances had been against the survival of the seedling, for the eighteenth century was a time when the foundation of medical and scientific societies was rife, and the mortality among them was heavy so that few still existed to-day. The Royal Medical Society, however, seemed to have been robust from the start, and it had never looked back. Before it reached its first half-century a hall had been built, the society had received a Royal Charter, and a library had been started, and in the middle of last century the society became possessed of its present house. The speaker wondered why that society had succeeded when so many had failed, but he thought there were several reasons. The society must have supplied a need which the University failed to provide, and had proved itself complementary to the education of the classrooms and Infirmary. The medical student had to spend most of his time in absorbing facts and having the views of teachers pumped into him, and this society had provided him with a means for self-expression, if necessary with a heterodoxy which would be perilous in the examination hall. Secondly, the society had been a great help to its members in the digestion of knowledge. The medical student to-day was crammed with facts. Nothing was so good for mental dyspepsia as open discussion, and mental digestion, like its physical counterpart, proceeded best in public. Argument and refutation, ridicule and laughter, had always been provided by the Royal Medical Society in abundance. The most important principle in the training of doctors was expressed in the old saying "You can't have the terriers too soon at the rats," or, in other words, the student could not be brought too early into contact with patients, and this was stimulated by the Royal Medical Society. The society had witnessed many changes in practical medicine, including the disappearance of the polypharmacy and antiphlogistic treatment of the eighteenth and early nineteenth centuries, and two of its old members, Lister and Simpson, had inaugurated the advances of antisepsis and anaesthesia. The society had survived many political troubles. The present times held a threat to intellectual life which had been unknown in Europe for many generations, for in several countries free discussion and open expression of opinion, even in scientific matters, were no longer tolerated so that there was all the more need for societies to which intellectual freedom was the breath of life and where unrestrained individual opinion was not only tolerated but encouraged. Dr. Lowdon, in reply, said that the society was constituted by a membership which ranged from their oldest living member, Sir James Crichton-Browne, who joined in 1858, to the last undergraduate who added his name to the roll. He suggested that a telegram of warmest greetings should be sent to Sir James. Speaking of present activities, he said that the numbers attending the meetings were greater than ever, and last year sixty-six new members had joined, while this year again they had enrolled sixty-six new members up to date. The bicentenary fund, which would be used for preservation and endowment of the library, now amounted to £1,800, but more subscriptions would be needed. The toast of "The Royal Colleges" was proposed by Dr. R. F. Dawson and acknowledged by the Presidents of the two Colleges, and the toast of "The Chairman" was given by Sir David Wilkie.

On February 26 Sir Auckland Geddes, a past-president of the Royal Medical Society, read a dissertation. Explaining its title, "A Voice from the Grandstand," Sir Auckland said that for many years his path had lain away from the profession of medicine, and he now felt like one of those pathetic figures who frequented grandstands at international football matches, and who, on the strength of precarious membership of school clubs forty years before, shouted advice and criticism to the national

players. The root of the present discontent among the public seemed to be that medical students were never given a chance systematically to study man as a whole. Beyond their scientific knowledge of man lay an incompletely explored area in which important things happened without discoverable cause, but they had become so sure that science was the only door to knowledge that they tended to ignore the older ways of approach. If they could succeed in reawakening the sense of wonder which in the days of the Renaissance gave birth to science itself they could make fresh starts along new lines. The brilliant achievement of science had won prizes by disciplined curiosity, but that must not obscure the fact that to-day science was running into blind alleys from which it could only emerge by escaping from direct touch with human understanding. A vote of thanks was proposed by Professor R. W. Johnstone and seconded by Dr. R. F. Dawson, in which the former reminded the members that Sir Auckland Geddes, as a president of the society, had given a dissertation some thirty years ago on the subject of "Waste," and that he had later been a professor of anatomy in McGill University, director of recruiting at the War Office, Minister of National Service, Minister of Reconstruction, and British Ambassador to the United States.

Central Midwives Board

At a meeting of the Central Midwives Board for Scotland, held for the election of office-bearers, with Dr. R. C. Buist in the chair, Professor R. W. Johnstone, C.B.E., M.D., F.R.C.S.Ed., F.C.O.G., of Edinburgh, was unanimously elected chairman and Professor James Hendry, B.Sc., M.B., F.C.O.G., of Glasgow, deputy chairman. The meeting appointed committees and examiners for the ensuing year.

Correspondence

A Bureau of Geographical Medicine

SIR,—The letters of Dr. F. C. Eve (*Journal*, October 24, 1936, p. 840) and Professor Walter P. Kennedy (November 14, 1936, p. 1002) prompt me to ask to be allowed to bring to the notice of your readers the existence of an organization designed to meet, to a certain extent at any rate, the needs they have so clearly expressed for a central bureau. Those of us working among non-European races rapidly become aware of the fact that physiological constants based on observations of a small sample of human beings are not necessarily the average constants of any other or all other races. At its meeting held in Zurich in 1934 the International Federation of Eugenic Organizations discussed this problem, and the result was the formation of a Committee on Anthropological Physiology. The aims of this committee, of which I am chairman, are: (1) to stimulate the investigation of physiological constants among the various races of mankind; (2) to make contact with the workers on this subject in the different parts of the world in order that interchange of ideas and results may be facilitated; (3) to ensure that, where possible, similar methods may be used so that comparative data may be of greater value; and (4) to provide at the meetings of the organization facilities for investigators to meet and discuss their problems. Owing to the nature of this committee it is doubtful whether as a whole it will ever meet, and hence its numbers are not limited; rather it is advisable to have it as large as possible, and have on it a representative of every country where physiological standards are being investigated. The main duty of each member towards the committee is to keep the chairman informed from time to time of the work being done in his particular part of the globe. This information is then circulated to all other members by the chairman. In order that investigators may know who already represents the various countries on this committee, and also in the hope that workers not thus represented may be induced to volunteer to act as members, I should like to give the personnel of the committee as it now stands.

America.—Professor L. Snyder, Columbus, Ohio; Professor Benedict, Boston, Mass.
China.—Dr. H. G. Earle, Henry Lester Institute, Shanghai.
India.—Lieut.-Colonel Bhatia, Grant Medical College, Bombay.
Japan.—Professor Sen Nagai, Imperial University, Tokyo.
Netherlands Indies.—Professor Radsma, Batavia.
New South Wales.—Professor Whitridge Davies, Sydney.
South Australia.—Professor Clelland, Adelaide.
Denmark.—Dr. Taga Kemp, Copenhagen.

Information concerning the work of this committee in particular and the organization in general may be obtained from the honorary secretary, Mrs. C. B. S. Hodson, 443, Fulham Road, London, S.W.10.—I am, etc.,

The University, Hong Kong, Feb. 4. LINDSAY RIDE.

Specific Antitoxins for Gonococcal and Meningococcal Infections

SIR,—May I be allowed to discuss several points and state facts concerning matters raised by your annotator in the *Journal* of February 13 and of February 27 in regard to my paper on gonococcus antitoxin published on February 13 (p. 321). The annotation stated that the starting-point of the work which had led to the adoption of this treatment was an attempt by Corbus to prepare a Besredka "antivirus." Had this been so I should have acknowledged Corbus. Without decrying his work, may I state the facts more explicitly.

For many years all the known methods of treatment, their possibilities, and what we thought might be fruitful avenues of research had been discussed between Professor Edward Mellanby and myself. Over a period of twenty years innumerable experiments achieved little until on February 2, 1934, Mellanby sent me a letter from the office of the Medical Research Council stating that he was very anxious for me to meet Dr. Mervyn Gordon of St. Bartholomew's Hospital to discuss "the possibility of testing some antitoxic preparations in gonorrhoea, as he [Gordon] had much experience in the problems of the meningococcus which might be extended to the gonococcus." Immediately communicating with Gordon I received a letter three days later in which he expressed the opinion that "the problem of immunity as regards the gonococcus is not so vastly different from the same problem in relation to the meningococcus." Active cooperation followed, and I enjoyed the inestimable advantage of Gordon's mature experience and judgement.

I feel, Sir, that your annotator hardly does justice to the part played by Mellanby and Gordon in this work, although I tried to do so in my paper. May I record again that the starting-point of the work was our recognition of the close similarity of the meningococcus to the gonococcus, and Gordon's previous researches in connexion with meningococcal meningitis which resulted in such brilliant clinical results.

Again, as a practical clinician I am not too concerned with your annotator's academic discussion and the interpretation placed on tests by bacteriologists *to the complete exclusion of the clinical results.* Apart from my own observations the clinical evidence submitted by Dr. Stanley

Banks in the *Journal* of February 20 (p. 415) has provided a complete answer: twenty-four patients out of twenty-five recovered from an infection, the mortality rate of which, before Gordon's war researches, was extremely high. The close similarity of the organisms and Banks's clinical results support the view that meningococcus antitoxin (Ferry) contains antitoxic properties, and my results seem to indicate that the same applies to gonococcus antitoxin. Whether these sera are endotoxic or exotoxic seems to me an academic question which can be decided by further investigation in the laboratory, especially as both Ferry and Gordon state that the meningococcus toxin is remarkably thermostabile.

While in agreement with your annotator that facilities for preparing and testing sera should be available to research workers in this country it is to be regretted that such was not the case. Furthermore, so far as I am aware, Dr. Ferry was the only investigator who had ever produced a soluble toxin with which to immunize the horses. Had it not been for the courtesy of Parke, Davis and Co. in complying with my request this work could not have been accomplished. My investigation was accelerated by the fact that Ferry some time before had actually produced an experimental gonococcus antitoxin, and this first batch was the material which I employed in my early cases.

The question asked by one of your correspondents as to whether adjuvant treatment was employed can be readily answered. Some of the cases quoted had no other treatment, others were treated along routine lines. After all, one does not rely on antitoxin in treating a case of diphtheria to the exclusion of throat sprays, cardiac stimulants, and skilled nursing.—I am, etc.,

London, W.1, March 1. T. ANWYL-DAVIES.

Oxygen Administration

SIR,—Recently a box mask was introduced for cheap and efficient administration of oxygen. The mask described previously was for adults (14 years or older). Inquiries having been made as to the application of the mask to younger patients, details are given in the table below for the correct dimensions of the mask for various ages, and also the approximate rates for flow of oxygen for ordinary conditions of pneumonic anoxaemia. Higher rates may be tried if necessary. These rates have been worked out from the tidal air for various ages. The mask may be cut from a suitable light cardboard box and a light rubber tube (internal diameter 5 mm.) in about ten minutes, following closely the details given in previous communications (*British Medical Journal*, 1936, **1**, 1245, and *Lancet*, 1937, **1**, 82).

Dimensions of Mask and Rates of Oxygen Flow for Various Ages

Age	Weight in Kilos	Tidal Air	Dimensions of Mask				Rate of Oxygen Flow, Litres Per Minute
			Length	Breadth	Depth	Volume	
		c.cm.	cm.	cm.	cm.	c.cm.	
0-6 months	3.77	48	6	5	3.5	105	0.7-1
6-12 months	7.7-12	85-129	8	6	4	192	1-2
3-7 years	14.3-19	124-221	12	9	4	432	2-3
8-14 years	22-29	221-395	13	10	5	650	3-4
14 years and over (adult)	60-70	440-550	15	12	7	1260	5-6

The efficiency of the mask depends on the inlet tube being turned back on itself and placed in the correct position inside the mask, so that the in-coming oxygen strikes the middle of the top of the inside of the mask. The opening at the back of the mask to accommodate the nose, mouth, and part of the chin must be cut to suit the size of the patient's face. The mask must be connected with a "bobbin" flowmeter and automatic regulator for the oxygen cylinder, as shown in the papers already referred to.

The masks may also be made of aluminium or a wire frame with a linen or silk covering (makers, Siebe Gorman and Co., London, S.E.1).—I am, etc.,

London, N.W.3, Feb. 25. J. ARGYLL CAMPBELL.

Angioneurotic Oedema of the Tongue

SIR,—The recent references to angioneurotic oedema (*Journal*, January 30, p. 244; February 6, p. 299) prompt me to record a similar case.

About nine months ago my patient woke with a swelling of his tongue, which he thought was due to a sting, as he slept with his mouth open. In two hours his tongue was so large that he could not speak or swallow his saliva. About one and a half hours later the swelling began to subside, and in six hours the tongue was normal.

On January 2 this year he woke with pain in his bladder, and Dr. Langwill was consulted. He was found to be suffering from oxaluria, which rapidly subsided under treatment.

On January 5 he woke with swelling of his tongue again, which rapidly became worse. The jaws were forced widely open and his tongue protruded, so that he could neither speak nor swallow, and saliva dribbled from the corners of his mouth. He had the feeling of impending suffocation. Dr. Langwill was called, and gave him 10 minims of adrenaline chloride, but the swelling steadily increased and a brawniness appeared below the chin. I was called in with a view to opening the trachea if necessary, but by the time I arrived the swelling had begun to diminish. He was given another dose of adrenaline chloride and arrangements were made with a near-by nursing home in case of a recrudescence. At the nursing home preparations were made for a laryngotomy if it should become necessary.

The swelling gradually disappeared and had quite gone by 6 p.m. The patient had eaten a raw peach the day before and had also had bladder trouble recently—two factors which, curiously enough, were mentioned by Dr. Hughes (*Journal*, January 16, p. 121).

A patient who has a respiratory obstruction almost invariably becomes extremely anxious; this nervousness is often communicated to the doctor either by the patient or his friends, who want something done to relieve the possible risk of suffocation, and tracheotomy is almost always considered and I have no doubt is in some cases done. Anyone who has studied the sudden swelling of the tongue, whether from inflammation, trauma, stings, or other causes, knows that tracheotomy should be avoided at all costs. Incisions into the tongue will as a rule relieve all symptoms, especially if the tongue be squeezed, as one would squeeze a sponge, after making them. But in angioneurotic oedema I think a far preferable operation is a laryngotomy. This is very simple, produces no haemorrhage, and is a purely temporary measure, causing the least possible inconvenience. It has also the advantage over tongue incisions that should the angioneurotic oedema spread to the larynx there is no danger to life. I have never heard of suffocation from angioneurotic oedema spreading to the larynx, but there is no reason why it should not do so.—I am, etc.,

London, W.1, Feb. 23. DUNCAN C. L. FITZWILLIAMS.

Cancer of the Breast

SIR,—We feel that the letter of Dr. W. Griffiths (*Journal*, February 20, p. 416) is apt to be misleading to those inexperienced in radiation therapy. In advocating contact *x*-ray therapy we gather that he is referring solely to the treatment of cancer of the breast.

He says "that the sole virtue of radium lies in our ability to place it in contact, or nearly so, with the growth." This applies perhaps to interstitial therapy, where the radium is actually introduced into the tissues in the immediate vicinity of the growth and so arranged that adequate "cross-fire" is obtained; but it certainly does not apply to surface radium applications. Ten years ago we were treating rodent ulcer and squamous-cell carcinoma of the skin with radium tubes in contact, and though early results were good, recurrence in the less superficial lesions was fairly common. During the past seven years the increased depth dose obtained by irradiating at a distance of 1 cm. (or more in deeply infiltrating lesions) has given uniformly excellent results from the points of view of primary healing and freedom from recurrence; incidentally intensive doses of *x* rays (100 kV with a 0.5 mm. aluminium filter at a distance of ten inches), administered over a period of a week or ten days, has given in the few cases in which we have tried it equally good results. In the treatment of such localized superficial conditions contact *x*-ray therapy may give comparable results.

To return to the subject of cancer of the breast. The types of case with which the radiologist is called upon to deal are so varied that no single technique of irradiation can be universally applicable. Interstitial radium, high-voltage *x* rays with heavy filtration, and lower-voltage *x* rays with less filtration, all have their place. It seems to us that contact *x*-ray therapy, even with the increased kilovoltage which Dr. Griffiths suggests, must have a very limited scope in the treatment of breast cancer. Isolated skin nodules certainly might be successfully dealt with, but the rapid falling off of intensity at the edge of any but small skin fields inseparable from this "close-up" therapy would make it difficult to apply in those cases of extensive nodular skin recurrence, sometimes confluent and ulcerating, which are so commonly encountered. Assuming the desirability of lower voltage, why not an adequate distance? In dealing with the primary inoperable growth, glandular or bony metastases, the inadequate depth dose obtainable with contact therapy must surely rule it out.—We are, etc.,

J. E. BANNEN.
R. HERMON.

Hull, Feb. 23.

Intraperitoneal Haemorrhage from a Graafian Follicle

SIR,—The recent correspondence in your columns (*Journal*, February 13, p. 362) prompts me to mention two further haemorrhages of ovarian origin in patients who were admitted into the Middlesex Hospital during the last two years, and whom Mr. Gordon-Taylor kindly allowed me to treat. By his courtesy I am enabled to put their cases on record. I believe, incidentally, that Gordon-Taylor was among the first to draw attention to this type of ovarian haemorrhage in a paper published in the *Archives of the Middlesex Hospital* in 1908 (Clinical Series, No. 4, p. 36).

His patient was an unmarried woman of 26. Two days before she was brought to hospital she had complained of severe pain all over the abdomen, which had subsided, but recurred the following evening and caused her to faint several times. On reaching hospital her condition was so grave that the doctor who had brought her thought her to be already dead, and there was some debate whether she should be taken to the mortuary or rushed to the operating theatre. The latter was decided upon, and after an intravenous saline had been given the abdomen was hastily opened. An enormous quantity of fluid blood and clot was found, and blood was seen to escape from a small rent in the left ovary. A ruptured ectopic pregnancy was diagnosed and the left tube and ovary were removed. Pathologically, however, there was found to be a ragged cavity in the ovary a quarter of an inch in diameter, which contained blood clot. The cyst was lined by vascular lutein tissue.

She made an uneventful recovery, but was readmitted four months later with right-sided abdominal pain, which was found at laparotomy to be due to an enlarged cystic right ovary, one cyst being two inches in diameter and filled with recent blood clot. The two cases seen recently were as follows.

Case 1.—A single woman, aged 35, admitted on June 30, 1935, had complained of pain in the right iliac fossa on the previous day. This had gradually spread towards the epigastrium. Her abdomen was soft, but she was tender in the right iliac fossa just below and to the right of the umbilicus; her temperature was 100° F., pulse rate 96. Her menstrual period had begun three days previously. She had suffered from dysmenorrhoea for some time past. On opening the abdomen through a right paramedian incision a large quantity of fluid blood and two handfuls of clot were found. Blood was escaping from the right ovary, which was removed together with the tube under the impression that we were dealing with a case of ruptured ectopic pregnancy. When the specimen was examined afterwards it was found that the blood was coming from a haemorrhagic cyst in the ovary. On section the cyst proved to be a corpus luteum.

Case 2.—A single woman, aged 24, was admitted on May 20, 1936. She had had an acute attack of general abdominal pain on the previous evening. She was tender in the right iliac fossa, but not rigid; her temperature was 98.4° F., pulse rate 80. She had suffered from dysmenorrhoea, and her next period was due in a few days' time. On opening the abdomen a large quantity of liquid blood and a handful of clot were removed. The bleeding came from a ruptured cyst three-quarters of an inch in diameter, which was situated in the ovary. The cyst was excised and the rent in the ovary sutured. On section the cyst was lined by lutein cells.

Neither of these cases was as dramatic as the one described by Gordon-Taylor. There was no evidence clinically of severe haemorrhage when they were brought to hospital, and both patients were operated on as cases of acute appendicitis. In both cases the haemorrhage was from a lutein cyst and not from a Graafian follicle, and on looking at random through some of the large number of reported cases I have found the same observation recorded wherever the ovary or cyst was examined histologically. Mr. Porter, in a recent letter, says: "On section the ovary showed a normal Graafian follicle with no suggestion of decidual cells or anything suggestive of an ovarian pregnancy." He does not state whether lutein tissue was present.

In reporting these cases my object is not to draw attention to a rare condition, but rather to suggest that it is one which occurs not infrequently and deserves better recognition in surgical and gynaecological textbooks as a cause of acute pain in the right iliac fossa. When the ruptured cyst is on the right side the differential diagnosis from appendicitis is difficult, but it should be strongly suspected in the following circumstances:

1. When the patient has suffered from dysmenorrhoea and the attack of pain which brings her to hospital is similar in character although more severe.

2. When the pain starts in the right iliac fossa and spreads towards the midline.

3. When the attack comes on at the beginning of a period or a few days previously.

Sackett (*Amer. J. Obstet. Gynec.*, 1932, **23**, 849) says that ovarian haemorrhage may be excluded in the first and second weeks of a menstrual period.

In severe haemorrhage an ectopic pregnancy may be diagnosed, but this is usually accompanied by anomalies of menstruation and a blood-stained vaginal discharge, which are not features of "lutein haemorrhage." In those cases where the haemorrhage is discovered unexpectedly at operation recognition of its lutein origin will save the unnecessary sacrifice of tube and ovary.—I am, etc.,

J. C. LEEDHAM-GREEN,
Resident Surgical Officer, General Hospital, Birmingham.

February 24.

Progesterone in Pre-eclamptic Toxaemia

SIR,—The paper on progesterone in pre-eclamptic toxaemia in the *Journal* of February 13 (p. 311) raises the important question of the criteria to be adopted in determining the severity of a case of toxaemia of pregnancy when the efficacy of any new treatment is under consideration. The authors of the paper have taken the incidence of fits after the institution of hospital treatment as such a criterion. Surely fits occur so seldom even in severe cases once hospital treatment has been established that some other index of severity must be adopted? The main if not the only end of treatment in these cases is the securing of a live child. Recovery of the mothers can be assured in practically every case, at all events immediate recovery, if induction of premature labour is practised regardless of the viability of the foetus. The success of any new form of treatment can therefore only be measured by the extent to which it significantly modifies the proportion of live children obtained. Judged by this criterion the results of progesterone therapy do not seem encouraging.

Although the clinical results of the research may be inconclusive the authors have, however, done a very real service in correlating the two problems of pregnancy toxaemia and the hormonal changes which occur at the end of pregnancy. It may well be that the causes of the onset of normal labour are to be found in a study of those factors which bring on labour prematurely in the majority of cases of toxaemia, even in cases where intrauterine death of the foetus cannot be held responsible.—I am, etc.,

Liverpool, Feb. 23. PERCY MALPAS.

Hypochromic Anaemias and Iron Deficiency

SIR,—I hasten to apologize to Dr. Fullerton for the misquotation which he pointed out in his letter in the *Journal* of February 27 (p. 471). The figure which was meant for the iron in lactation was 250 mg., not 750 mg., an approximation to nine months' lactation at about 1 mg. a day.

With regard to Dr. Fullerton's other complaint, the whole matter seems to me to hinge on his statement in his letter to you that he found 9 grains of ferrous sulphate "a satisfactory dose in the great majority of cases." If he had left out the word "great" I should have been in complete agreement with him. The opinion I have formed is that the number of patients who require a larger dose is sufficiently high to justify stating the *average optimum* dose at a higher figure. In this context I think my statement that only ten out of twenty-one cases in his series responded satisfactorily is a fair criticism. He has formed the opinion that the other eleven failed to respond because of complications or because, like Case 18, they did not take all of the dose. None of the complications as given in the paper is an absolute bar to satisfactory response, and from the facts which he gives it is open to me to form the opinion that, had he used a larger dose, more than ten, although probably not all the twenty-one, of the cases would have responded by 1 per cent. per day. My remarks were in no sense a criticism of his work, which is to me most interesting. He rightly excluded nine cases in the attempt to make a comparison between the different iron preparations. I am only critical of his conclusion from rather a small series of cases that "iron and ammonium citrate grains 90, pil. ferri grains 45–60, and ferrous sulphate grains 9 are equally efficacious." I do not think that his figures prove this, and I should be sorry to see the value of large doses of iron lost sight of. After all, ferrous sulphate, 3 grains three times a day, has been in many pharmacopoeias for a very long time, but the value of iron therapy only came into its own with the introduction of larger doses.

My conclusions about the average optimum dose of ferrous sulphate are drawn not from Dr. Fullerton's paper but from my own experience and that of other physicians.—I am, etc.,

Cambridge, March 1. J. F. BROCK.

Prostatectomy by the Two-stage Method

SIR,—Mr. Walter W. Galbraith, in his letter in the *Journal* of February 27 (p. 472) criticizing my article on prostatectomy by the two-stage method, takes me to task for, among other things, using a "messy" suprapubic box which is applied not only outside the bladder but also outside the abdominal wound.

Yet he advocates a method which necessitates a catheter in the urethra and bladder for twenty or more days in the majority of cases. I have visited some of the patients operated on by one of the greatest exponents of the Harris technique which Mr. Galbraith thinks so "amazing," and, when I have watched the pus dripping from the urethral meatus of a swollen penis during catheter drainage and the urine leaking from the suprapubic incision after the catheter had been removed, I have come to the conclusion that it was one of the most repulsive sights I have ever seen in post-operative convalescence. As to the box being "messy," I should have thought it would be much more to the point to attack those responsible for the post-operative treatment rather than the technique of the operation.

Mr. Galbraith, who evidently looks upon a preliminary cystotomy as a "major" operation, asks if I use a third anaesthesia when I remove the gauze packing from the prostatic cavity. I can assure him that an anaesthetic is not necessary for the removal of the gauze when it is properly inserted.

Mr. Galbraith goes on to tell us that the Harris technique is "a tremendous advance" on the Thomson-Walker operation. I should like to know what are his grounds for thinking so. In my opinion for those who prefer an "open" operation the Thomson-Walker technique in which the patient is left with a large vesical outlet is infinitely superior to that of the Harris method in which the patient is left with a deformed vesical neck.

Mr. Galbraith says it is obvious that I know little about the Harris technique because I state that the bladder neck is sutured round the indwelling catheter. I actually said: "The mode in which the bladder neck is sutured round the indwelling catheter which is left *in situ* for ten or more days after the operation." I did not infer or state, as Mr. Galbraith evidently thinks I did, that the bladder neck was sutured round the indwelling catheter while the instrument was *in situ*.

After this he writes: "That is only one of his misstatements (to call them nothing worse); his whole paper bristles with them." So far Mr. Galbraith has not brought to light any "misstatements." I should have thought that after making such a sweeping assertion it was his duty to do so.

The late Mr. Harris operated on two patients at St. Paul's Hospital during his visit to London in 1935, and it is with the greatest reluctance that I make a few critical remarks about the convalescence of these two cases; but as Mr. Galbraith claims so much for the Harris technique I feel compelled to do so. The first patient had an indwelling catheter for ten days following the operation, and after the instrument was removed the urine leaked through the suprapubic incision for three days. In the other case Mr. Harris inserted a suprapubic tube as he was unable to control the haemorrhage from the prostatic cavity. Yet Mr. Galbraith writes that "the Harris wound heals by first intention."

Near the end of his letter Mr. Galbraith tells us that vesical neck pockets "are unknown." Does he mean they do not exist? Taking into consideration the shape of the prostatic cavity and the method of suturing used in the Harris technique, I should say that it is absolutely impossible to prevent puckering and pocket formation in a very large percentage if not all of the patients.

For some time I have been convinced that the two-stage prostatectomy through a short suprapubic incision will cure the largest number of patients with the least risk, and on carefully reading Mr. Galbraith's letter I certainly fail to find anything to make me think otherwise.—I am, etc.,

London, W.1, March 1 W. K. IRWIN, F.R.C.S.

Psychological Factors in Rheumatism

SIR,—Dr. J. L. Halliday, in your issues of January 30 and February 6, deals in exhaustive and delightful fashion with the above subject. The beauty of his diction, however, should not place him above criticism, and cramped as must be the exigencies of space in a letter, I would like to make a few remarks. My qualifications for doing so are, among others:

1. I have had about thirty years' experience as a general practitioner among a class of patients peculiarly prone to rheumatic affections of various types.
2. The class of patient Dr. Halliday reviews is also mine.
3. For almost twenty years I was medical officer to a prison, where I saw roughly twenty of Dr. Halliday's type of case to his one.
4. As one whose living is exposed to the same chances and changes as that of my patients I conceive I am in a better position to deal with them than one whose life is that of a State medical officer.
5. I understand Dr. Halliday has never done general practice, and it is evident from his article.

I deprecate Dr. Halliday suggesting that the Fathers of Medicine were blind to the psychical factor in their cases. I was taught that my bedside manner should aim at gaining the confidence of my patient, that I should do nothing to alarm, and should train myself to absorb the whole "atmosphere" of my patients' surroundings. It is common knowledge how well the old physician did so. "God and the Doctor we adore," etc. Does Dr. Halliday suggest we should leave the waters charted by the Fathers of Medicine to voyage with him in unknown seas with psycho-analysis as compass and Mrs. Eddy in the crow's nest? There would be strange landfalls! Possibly we would discover that modern "Golden Fleece"—the osteopathic lesion. All this type of rheumatic case has some advantage—monetary or other—in assuming "proud backs," etc. The father who can't get work naturally wishes to save his "face" before his family, etc.

My experience as a prison doctor may be illuminating. Every day there came to our door one or more men with lumbagos, "proud necks," stiff joints, and all the stigmata set forth by Dr. Halliday. These had existed for varying lengths of time—some many years—and many thousands of pounds had been paid out by different agencies to these people in consequence of their disabilities. Each case was treated very seriously by the medical officer. The patient was most strictly examined. He was put to bed in hospital in a room by himself. He was given his choice of castor oil or Epsom salts. A Bible was put in his hand, and his diet consisted of two pints of buttermilk three times a day. In twenty years there was no case that did not recover completely within twenty-four hours. The cure endured throughout the sentence—anything up to two years—but the condition returned invariably and immediately on the prisoner's release.

Dr. Halliday would suggest he has discovered something new. The conditions he describes are as old as the boy shamming sick who does not wish to go to school. I would suggest it is a hazardous proceeding to correlate such common factors as "rheumatism" and "misfortune," and then explain them in terms of each other. After all, the chances are we shall all be orphans and all have rheumatism some time or another. If, on the other hand, I saw it frequently happen that a patient who had had the worst of a deal with his pawnbroker developed obscure testicular pain, or a racing motorist who had had "big-end" mischief quite frequently developed obscure rectal mischief, I should say there was a lot in Dr. Halliday's argument. It is ludicrous, *pace* Dr. Groddeck, that "when a mother dies he blames himself for it." If that be true I must be an exception to the rule, for I never thought such a thought, nor have I ever found it in my practice. What makes me guarded about psycho-analysis is that we have no guarantee that the doctor is not in his own way just as queer as his patient. When all is said and done all of us are, in our different ways, trying to escape. To be able to escape is our only chance to remain sane. To say that those cases should be sent to the priest or the parson for cure is surely a counsel of despair.—I am, etc.,

Glasgow, Feb. 22. JAMES COOK.

Wax Solvents

SIR,—I read with interest Mr. Terence Millin's memorandum on the removal of wax from the bladder (*Journal*, February 27, p. 446). A short time ago I was asked to treat a case of chronic discharge from the ears. The drums were intact and the patient an otherwise healthy young man. The traditional methods of irrigation following the instillation of peroxide and bicarbonate gave no relief, and I therefore endeavoured to find some solvent which would penetrate and soften the wax while carrying through it some antiseptic substance. It appeared to me likely that there was a vicious circle of wax formation—mechanical irritation of the meatus, infection, and then more wax formation in response to these stimuli. My textbooks contained no description of the properties of the wax found in the human ear, nor did a chemical dictionary give much help. I was also unable to find any reference to solvents which might be used with safety in the ear other than those I have mentioned. However, I did not anticipate that harm would result if liquid paraffin were instilled, and this was employed as a vehicle for acriflavine. The results were most gratifying. After three or four treatments both ears were again healthy, and there has been no relapse, though the condition had been present for eighteen months.

I consider this to be a rational treatment, and have no hesitation in recommending it to others. I have since

read an article by Natier in the *Revue Internationale de Rhinologie, Otologie et Laryngologie* (1898, **1**) in which it is stated that two-thirds of dry cerumen are made up of fatty substances soluble in alcohol and ether and that cholesterin represents 7 per cent. The other constituents are also described, but unfortunately there is no description of the solvent effect of paraffin on any of these. I do not know whether dilute xylol could be used in the ear. It is worth trying.—I am, etc.,

Buxton, Feb. 27. G. C. PETHER, M.D.

Radiograph or Radiogram

SIR,—I have recently had brought to my notice a short article in the *Morning Post* of Friday, January 22, 1937, headed "What is a Radiogram?—by our Medical Correspondent." This letter refers to correspondence in the *Lancet*, from which it appears that an endeavour is being made to support the use of the word "radiogram" in referring to what the general public call an "*x*-ray photograph."

I am addressing you on behalf of the British Institute of Radiology to urge that such a step be strongly opposed by the medical press of this country. The word radiogram is a reasonable contraction of radio-telegram, and as such it has been in use for something over thirty years; the fact that it has recently been adopted also as a contraction for radio-gramophone may cause some concern to the Postmaster-General, but makes it still less desirable to employ the word in the manner suggested in my first paragraph. The word "radiograph" has been used by most radiologists, and many of their colleagues, for probably a similar period, as a contraction for *x*-ray photograph. It is by no means an ideal word, especially as it is used also to denote an instrument for recording intensity and duration of sunshine; there can be no doubt, however, as to which of the two meanings is more generally understood. If a better word than radiograph could be coined it would be very acceptable, but there appears to be no valid reason for discarding it for a word which has nothing to recommend it, and which is already in general use under an entirely different meaning. There is something to be said for the word "*x*-radiograph," but it is clumsy, and would almost certainly be shortened to radiograph within a short space of time.

I brought this matter up for discussion at last month's meeting of the Medical Committee of the British Institute of Radiology, which considered that nothing had occurred to alter the opinion which it recorded in November, 1934, when the following resolution was passed:

"After discussion it was unanimously agreed that in referring to the photographic product of an *x*-ray examination the word 'radiograph' should be used, both as a noun and as a verb, in the same way as the word 'photograph' is used. It was pointed out that this is correct according to the *Oxford Dictionary*."—I am, etc.,

R. BOULTON MYLES,
38, Welbeck Street, London, W.1, Honorary Medical Secretary.
March 1.

*** We are in entire accord with the resolution passed by the Medical Committee of the British Institute of Radiology. It is our practice to use the word radiograph in preference to radiogram, which is now in general use either for a message transmitted by wireless telegraphy or for a combination of a wireless set and a gramophone. The *Oxford English Dictionary* defines radiograph in this context as "an impression or image of an object produced on a sensitive plate by means of the Röntgen rays."—ED. *B.M.J.*

Language for the Deaf

SIR,—The recent correspondence in the *Times* on the subject of "language for the deaf" may have attracted the attention of the medical profession. Interesting, however, as was this correspondence, there is reason to fear that since it dealt almost exclusively with *methods* of teaching, it has only served to obscure the real object of special education for the deaf. The object of such education is to enable the born deaf (totally or partially) and those who have become deaf (totally or partially) before full spoken language has been acquired, to understand and use the English language *as it is written*.

There is difference of opinion as to how this object can most rapidly be attained—that is to say, those best able to judge do not agree as to the best medium to be employed. The pure oralist would allow no finger-spelling or signing (the two are quite distinct) in the classroom, and would do his best to stop signing out of school. The pure manualist would say that since the speech of the deaf is rarely pleasant or very intelligible, and since lip-reading is an unreliable medium, it is a waste of time to teach either.

Between these two extreme views there are the opinions of experienced teachers who favour this or that combination of mediums. Good results have been attained by any of these methods. One is tempted to say, "That which is best administered is best." All the educated deaf, however, and all those who have spent their lives helping them, are agreed on two points: first, that the object of special education for the deaf is to give to every deaf child a thorough understanding of and power to use the English language as it is written. Secondly, that, be the method what it may, the deaf child must have at least ten years of steady special education, starting not later than the age of 5 years.

Whether the deaf child speaks or whether he finger-spells, or whether he does both, such mediums are useless to him in his manhood unless he possesses a full command of that immense intricate arrangement of symbols which we term "the English language." To give language to the deaf is a task of high scientific character. To take a deaf child through simple nomenclature of things and qualities, to teach him the different modifications to express juxtaposition of things, comparison of qualities, etc., to unfold to him the absolutely necessary but strangely intricate combination of symbols whereby verb tense is expressed, to lead him through idiomatic and figurative language—this work possesses a fascination undreamed of by any other body of teachers in the world. It is unfortunate that few men and women of first-class intellectual attainments are found to undertake it. The field is comparatively small and the financial rewards are modest.

Sir, there are deaf men and women of average adult intelligence in England to-day who are unable to read an ordinary book or newspaper. There are deaf boys and girls leaving school to-day who will never understand the English language—that is, they will never be able to visualize from a written description and they will be unable to follow arguments expressed in adult language. They could have learnt to do so: they were not given the time: they started too late.

The saddest cases are those of the children of the professional and leisured classes. These people are not visited by the attendance officer, and they are not compelled to send their children to a special school. These people can afford to, and they do, consult general practitioners and

specialists. These people can afford to, and they often do, buy one or other of the instruments by means of which, as advertised, "the deaf can hear."

Useful as some of these instruments are in some cases of acquired deafness among adults and to somewhat improve the speech of deaf children, they can never take the place of special instruction in language. Consider: it takes a normal child five years of 365 days each, working at it as he does all his waking hours, to acquire such a knowledge of English as we associate with children of that age. It takes him five more years, working at it all his waking hours, to acquire the language of a 10-year-old child. Is it likely that through the eye, possibly assisted by some indefinite sound hearing, a deaf child can get a command of English in less than ten years?

Yet parents are advised to "wait and see"—"he is not totally deaf"—"he must not mix with the deaf and dumb"—"perhaps hearing will develop"—"let's measure it by means of the audiometer week by week"—"response appears to be hopeful"—"this or that vowel associated with this or that word is heard this week and certainly it was not a month ago"—"let him mix with hearing children"—etc. At long last his child reaches the specialized teacher, and eventually is obliged to leave school. He has not had time to acquire the English language, and now he never will: he might have done it; he might have taken a degree. The world of science and literature might have been open to him.

The outward behaviour of a deaf child, frustrated in his efforts to express his own thoughts and to obtain adequate answers to the natural questions of childhood, resembles closely that of a mentally deficient child, and the greater the intelligence the greater the frustration and the more pronounced the unusual behaviour. The more hearing power possessed by the child the less his chance of getting early to a school for the deaf—the only place where there are people specially trained to teach him.

I would ask, therefore, that in all cases of apparent subdevelopment of spoken language partial deafness should be assumed as the most probable cause, and the child given a chance of starting at once to learn the English language. The speech clinic is not the place for him; neither can the elocution teacher tackle such a problem. At a school for the deaf a few weeks will show whether the child can learn language. In any case no harm will have been done.—I am, etc.,

London, N.W.1, Feb. 24. BLANCHE F. NEVILE.

University of London Medical Graduates Society

SIR,—The University of London and its graduates are entering into a new heritage as their great building rises in Bloomsbury, for it will create a centre of university life such as London has long desired. The future, however, will be made by man and not by stones, for the traditional spirit of great centres of learning is created by the men who move in them. Our University has yet to develop its traditions in the fullest sense, for hitherto the graduates have had few associations with their University except as an examining body, and among the medical graduates the loyalties of professional life are given chiefly to their own medical schools. This has led in the past to a narrowing of outlook and has been a hindrance to progress. Lister was a London surgeon, yet London was almost the last of the great centres of medical work to acknowledge the truth of his teaching. He himself attributed this to the lack of a university and of the university spirit, which, valuing the search for truth above all else, subordinates to it all considerations of personal advantage.

London can never enjoy a university life as intimate as that which exists in smaller towns, but with the co-operation of its graduates it has now an opportunity of developing a university spirit and tradition along its own lines.

Nine years ago the University of London Medical Graduates Society was formed to provide a social meeting-ground and bring all graduates of the medical faculty of the University into touch with one another. The University has recently granted official recognition to the society, and the annual dinner on May 6 this year will be held for the first time in the University Banqueting Hall. The Vice-Chancellor has signified his intention of attending the dinner, and it is hoped that the occasion will arouse the interest of medical graduates in their University and that many who are not as yet members will join. Oversea graduates who may be in London for the Coronation celebrations will be specially welcome. Guests, medical or non-medical, may be invited by members.

The objects of the society are, in brief: (*a*) to bring medical graduates of the University of London into closer relationship with their University and with one another; (*b*) to keep in touch with oversea medical graduates of the University; (*c*) to promote the interests of the University and its medical graduates. The society has no political activities. There is an annual dinner in London during May, and dinners are held in other centres from time to time, whilst an afternoon reception and visits to places of interest take place during the spring.

The subscription is £1 for life, and applications for membership are invited and welcomed.—We are, etc.,

DOROTHY C. HARE,
President.
PHILIP H. MITCHINER,
Hon. Treasurer.
LOUISE LIVINGSTONE,
JOHN P. HOSFORD,
Hon. Secretaries.
VICTOR BONNEY,
Hon. Secretary for Oversea Members.

11, Chandos Street, W.1,
Feb. 20.

Insufficient Sleep for Children

SIR,—In communications which have been appearing lately in both the medical and the lay press on the subject of malnutrition I see little mention of the important factor of want of sleep in the production of this condition. Sufficient and undisturbed sleep is almost as essential as suitable food for the growing child, and the want of it surely plays a leading part in producing the undersized and weary-looking child so frequently met with in the slum districts of London and the industrial towns.—I am, etc.,

London, W.1, Feb. 27. EVA MCCALL.

Protamine Insulin (with Zinc)—Suspension

SIR,—The retarding action of protamine, with the addition of zinc, on insulin has been the subject of investigation for some time past. Protamine insulin (with zinc)—suspension is now made available by the four firms associated with the manufacture of insulin in this country: Messrs. Allen and Hanburys Ltd., Boots Pure Drug Co. Ltd., The British Drug Houses Ltd., and Burroughs Wellcome and Co.

The preparation is a suspension of insulin with added protamine and zinc, of such a character that it is readily and evenly diffused on shaking prior to administration. As it is more slowly absorbed than unmodified insulin it

should be of particular use in cases where unmodified insulin does not provide adequate control or where several administrations daily are necessary. While extensive clinical trial has determined the issue of a satisfactory preparation there is still much to be learned about its general use; therefore care will be necessary if reactions are to be avoided due to unfamiliarity with its use or deviations from a properly balanced dietary.

Protamine insulin (with zinc)—suspension is issued at present in one potency: 40 units per c.cm. Two sizes are available—5 c.cm. containing 200 units, and 10 c.cm. containing 400 units. The packings will be distinct in colour from existing packings of unmodified insulin.—We are, etc.,

ALLEN AND HANBURYS LTD.
BOOTS PURE DRUG CO. LTD.
THE BRITISH DRUG HOUSES LTD.
BURROUGHS WELLCOME AND CO.

London, March 1.

*** An article on protamine zinc insulin by Dr. R. D. Lawrence and Dr. Nora Archer appears in this week's issue at page 487.—ED., *B.M.J.*

The Services

THE ARMY DENTAL CORPS

The War Office invites applications from dental surgeons for appointment to eight commissions in the Army Dental Corps. Candidates will be selected for these commissions without undergoing competitive examination, and will be required to present themselves in London for interview and physical examination about the middle of March, 1937. They must be registered under the Dentists Acts or Medical Acts, and be not over the age of 28 years. Successful candidates will, in the first instance, be given short service commissions for six years, at the end of which period they will retire with a gratuity of £1,000 unless during the fifth year they have applied for and been granted permanent commissions. Full particulars and forms of application may be obtained from the Director, Army Dental Service, the War Office, London, S.W.1.

DEATHS IN THE SERVICES

Major-General THOMAS MARTIN CORKER, C.B., late R.A.M.C., died in London on February 24, aged 80. He was born at Cork on May 2, 1856, the son of Thomas Ware Corker of Rushbrooke, County Cork, and was educated at Queen's College, Cork, where he graduated in 1876 as M.A. with honours and a gold medal and scholarship in the Queen's University of Ireland, and subsequently as M.D. and M.Ch. in 1879. He also studied for a while at St. Bartholomew's Hospital. Entering the Army as surgeon on March 6, 1880, in the same term as the late Sir Alfred Keogh, he attained the rank of colonel on August 26, 1905, and of Surgeon General on December 11, 1911, retiring on December 26, 1917. As an administrative medical officer he served successively in the Scottish Division, 1905–9; Egypt, 1909–11; Lucknow Division, 1911; Poona Division, 1912; and Secunderabad, 1913. He served in the North-West Frontier campaign in India in 1897–8, on the Malakund and in the operations in the Mamund country; and in the Tirah campaign of 1897–8, taking part in the actions of the Arhunga and Sampagna Passes and in the operations in the Bazar Valley, was mentioned in dispatches in the *London Gazette* of April 5, 1898, and received the Frontier medal with two clasps. He was made an Honorary Physician to the King in 1912, and received the C.B. in 1915, and the degree of LL.D. from the National University of Ireland in 1920. He was also a Knight of Grace of the Order of St. John of Jerusalem. In 1886 he married Florence, daughter of the late Mr. J. E. Leslie of Lee Carrow, Passage West, Co. Cork. He had been a member of the British Medical Association since 1888, and contributed letters from time to time to the *British Medical Journal.*

HIS MAJESTY'S HOUSEHOLD

THE MEDICAL APPOINTMENTS

The *London Gazette* of March 2 announces the following medical and dental appointments to His Majesty's Household, to date from March 1, 1937.

Physicians in Ordinary:
Viscount DAWSON OF PENN, G.C.V.O., K.C.B., K.C.M.G., M.D., P.R.C.P.
Lord HORDER, K.C.V.O., M.D., F.R.C.P.
Sir JOHN WEIR, K.C.V.O., M.B.
Sir MAURICE CASSIDY, K.C.V.O., C.B., M.D., F.R.C.P.

Physicians Extraordinary:
Sir FARQUHAR BUZZARD, Bt., K.C.V.O., M.D., F.R.C.P.
Professor JOHN A. RYLE, M.D., F.R.C.P.
GEORGE FREDERICK STILL, M.D., F.R.C.P.
HENRY LETHEBY TIDY, M.D., F.R.C.P.

Serjeant Surgeon:
WILFRED TROTTER, M.D., M.S., F.R.C.S., F.R.S.

Surgeons:
Sir THOMAS DUNHILL, K.C.V.O., C.M.G., M.D.
Sir JAMES WALTON, K.C.V.O., M.S., F.R.C.S.
Sir LANCELOT BARRINGTON-WARD, K.C.V.O., F.R.C.S.

Surgeon Oculist:
Sir STEWART DUKE-ELDER, M.D., F.R.C.S.

Consulting Surgeon Oculist:
Sir WILLIAM LISTER, K.C.M.G., K.C.V.O., M.D., F.R.C.S.

Manipulative Surgeon:
Sir MORTON SMART, K.C.V.O., D.S.O., M.D.

Surgeon Dentist:
C. S. MORRIS, M.R.C.S., L.D.S.

Surgeon Apothecary to His Majesty and Apothecary to the Household:
Sir STANLEY HEWETT, K.C.B., K.C.V.O., K.B.E., M.D.

Physicians to the Household:
ARNOLD STOTT, B.Ch., F.R.C.P.
DANIEL T. DAVIES, M.D., F.R.C.P.

Surgeon to the Household:
ARTHUR E. PORRITT, M.Ch., F.R.C.S.

Surgeon Oculist to the Household:
FRANK ANDERSON JULER, M.B., F.R.C.S.

Surgeon Dentist to the Household:
F. D. DONOVAN, C.V.O., L.D.S.

Surgeon Apothecary to the Household at Windsor:
Sir HENRY L. MARTYN, K.C.V.O., M.B., F.R.C.S.

Surgeon Apothecary to the Household at Sandringham:
Sir FREDERIC WILLANS, K.C.V.O., M.R.C.S.

Coroner of the Household:
W. H. L. MCCARTHY, D.S.O., *M.C.*, M.D.

Medical Household in Scotland

Physicians in Scotland:
JOHN COWAN, M.D., D.Sc., F.R.F.P.S.
ALEXANDER GREIG ANDERSON, M.D., F.R.C.P.
Professor JOHN WILLIAM MCNEE, D.S.O., M.D., F.R.C.P.

Extra Physicians in Scotland:
Sir ROBERT PHILIP, LL.D., M.D., F.R.C.P.
Sir ASHLEY MACKINTOSH, K.C.V.O., M.D., F.R.C.P.Ed.

Surgeons in Scotland:
Sir JOHN FRASER, K.C.V.O., *M.C.*, M.D., F.R.C.S.Ed.
Professor JAMES R. LEARMONTH, Ch.M., F.R.C.S.Ed.

Surgeon Oculist in Scotland:
ARTHUR H. H. SINCLAIR, M.D., C.M., F.R.C.S.Ed.

Surgeon Dentist in Scotland:
LESLIE C. BROUGHTON-HEAD, M.B., Ch.B., L.D.S.

Surgeon Apothecary to the Household at Balmoral:
GEORGE PROCTOR MIDDLETON, M.B., Ch.B.

Surgeon Apothecary to the Household at the Palace of Holyroodhouse:
NORMAN SCOTT CARMICHAEL, M.B.

Obituary

SIR HENRY JACKSON, BT., M.B.

Member of Parliament for Central Wandsworth

Of the small group of medical members of the present Parliament Sir Henry Jackson, who died suddenly after speaking at a public dinner on February 23, was so much occupied with other and quite different interests, and such an expert in them, that one did not at first think of him as a doctor with a practice on Putney Hill. He might have been described as one of the "medical truants," giving to public affairs, particularly transport, the gifts and driving energy which might have been devoted to medicine only.

But Sir Henry Jackson had that combination of qualities which enables a man to ensure success in many different spheres. He did not join the medical profession until 1914, when he was nearly 40 years of age, and then after taking the M.B. and Ch.B. degrees at Edinburgh he served in the R.A.M.C., attaining the rank of major. During the ten years 1901 to 1911 he had been Fellow at Downing College, Cambridge, and lecturer in natural science. It might have been possible to see in the Cambridge tutor the future general practitioner, but hardly the future expert in transport problems or Post Office rates or London bridge constructions. His early scientific career was a distinguished one. He obtained a first class in Parts I and II of the Natural Sciences Tripos. He was a contributor to the *Transactions* of the Cambridge Philosophical Society, the Chemical Society, and the Royal Society, and treatises from his pen on such subjects as glycogen and the synthesis of the derivatives from citric acid formed an unusual preparation for the hurly-burly of public life.

He was also singular in another respect—although a "Lancashire lad," having been born at Heywood just over sixty years ago and educated at Bury Grammar School, not really settling in London until after the war, he adopted the metropolis, or it adopted him so completely that he became one of the leading Londoners of his time. Practically his first entrance into public life was when he became a member of the Wandsworth Borough Council during the year after the war. He made his name on the Public Health Committee, his personality and parts were quickly recognized, and within two years he was mayor of this the largest of the London boroughs and one of the most popular mayors that Wandsworth has ever had. He was mayor for three years, voted to that position unanimously by a council which contained a considerable proportion of his political opponents. But although a keen party man—he made a strong party speech on the day of his death—there was something about him which made him popular with all parties. A fellow member of Parliament has stated that only a few hours before Jackson died he saw him with his arm round the shoulders of Mr. James Maxton—a man at the opposite pole of political thought—exchanging stories. It was this bonhomie, reflected in his rather Pickwickian countenance, which carried him far, and his substantial intellectual gifts, reinforced by a sound scientific training, carried him further. He resigned his mayoralty in 1924 to become parliamentary candidate for the central division of his borough; he was returned, and he continued to represent it, with one short interval, until his death.

Sir Henry Jackson took little part in medical politics, but he had an abiding interest in hospitals and was a keen upholder of the voluntary system. He was a member of the London Voluntary Hospitals Committee, also honorary treasurer of Bolingbroke Hospital, Wandsworth, where the erection of a new wing and its opening free of debt was one of his achievements. During his mayoralty he was instrumental in raising something like £20,000 for hospitals in his borough. On several occasions he appeared in the pulpit on Hospital Sunday. He was also a keen educationist, championing the cause of the teachers in elementary schools. He was accustomed to say that if Waterloo was won on the playing fields of Eton, the great war was won in the elementary school playground.

But it is probably as a traffic expert that he will be remembered. He was chairman of the London and Counties Advisory Committee on Traffic, and on various other bodies which had to deal with that problem. No select committee on the subject was complete without him. In the House of Commons he was seldom heard in debate, but in committee work his knowledge and judgement on many difficult questions, especially transport but also on health, were highly esteemed. He was one of the very useful men of his generation, and afforded a conspicuous instance of a man trained in science and medicine achieving rapid and substantial success in municipal and national affairs.

F. P. F. RANSOM, M.D.

Late Professor of Pharmacology, University of London

Dr. Frederick Parlett Fisher Ransom, who died at Weston-super-Mare on February 22, was formerly well known as a teacher and research worker in pharmacology. He was born at North Elham, Norfolk, in 1850, and began his medical studies at King's College, London, qualifying M.R.C.S. and L.R.C.P. in 1871. He then went to Edinburgh, where he obtained the M.D. degree in 1875. Continuing his studies in Germany, he was for a time assistant to Professor von Behring at Halle and to Professor Hans Meyer at Marburg. Dr. Ransom was for a long time lecturer in pharmacology and head of the pharmacological department at the London (Royal Free Hospital) School of Medicine for Women, and received eventually the title of professor of pharmacology in the University of London. In the early years of this century he published papers on saponin and cholesterin; on tetanus (with Professor Meyer); and on bronchodilator nerves (with Professor W. E. Dixon). During the war he served on the War Office Tetanus Committee, and published in the *Lancet* a paper summarizing modern views on this disease; he also contributed papers on antagonists of pilocarpine to the *Journal of Pharmacology*, and on the cardiac haemolytic effects of digitonin to the *Biochemical Journal*. When the British Medical Association held its Annual Meeting at Cambridge in 1920 he was vice-president of the Section of Physiology and Pharmacology. He had joined the Association as long ago as 1875, and only resigned last October owing to advanced age and blindness.

We regret to record the death of Dr. RICHARD PRICHARD, formerly medical officer of health for Cardiff rural district and medical officer of the Ely isolation hospital. A student of the University of Glasgow, he graduated M.B., C.M. in 1881 and proceeded M.D. two years later, obtaining the Cambridge D.P.H. in 1904. After qualification he was house-surgeon at the Glasgow Royal Infirmary, resident medical officer at the Glasgow Maternity Hospital, and for a time assistant physician to the City of Glasgow Fever Hospital. Dr. Prichard joined the British Medical Association in 1883, and served as president of

the South Wales and Monmouthshire Branch in 1926–7. He had also filled the presidential chair of the Cardiff Medical Society and of the West of England and South Wales Branch of the Society of Medical Officers of Health. Dr. Prichard had contributed papers to the *Glasgow Medical Journal* and to *Public Health*. At the funeral in Cardiff Cemetery on February 20 representatives were present on behalf of the British Medical Association, the Cardiff Royal Infirmary, the Cardiff Rural District Council, the University College of South Wales and Monmouthshire, and the Local Medical and Panel Committee; and many local practitioners from Cardiff and its neighbourhood.

DAVID ROBERTSON MACGREGOR died from pneumonia after a short illness on February 4. He was born at Dunfermline in 1878 and took the B.Sc. degree of St. Andrews University and the M.B., Ch.B. of Edinburgh in 1902, gaining the Freeland Barbour prize in his year. He spent a year in Dundee Infirmary and two years as assistant to Dr. Tuke of Dunfermline. After a short period of practice in Fife he settled in Wallsend-on-Tyne in 1908, when that town was increasing in population with shipbuilding activity. During the latter part of his residence there he was assistant to the Throat, Nose, and Ear Hospital in Newcastle-upon-Tyne, and finally gave up general practice in 1926 when he was appointed full surgeon. He obtained the D.L.O. in the same year. He took a great interest in the hospital and devoted a good part of his time to it, and was also throat and ear surgeon to Newcastle General Hospital. Mr. Macgregor was surgeon to the education authorities of Jarrow and Wallsend, and was a part-time referee to the Ministry of Health. His health had not been good for some years, and following a poisoned hand three years ago he had never regained his vigour and strength. He was conscientious and skilful in all his work, and a large number of practitioners will miss his kindly counsel in their throat and ear cases. He had the red hair traditional to the Macgregors and his courtesy and kindliness was what one expects from the descendant of a Highland clan. He had no family, and his wife and he were an ideal couple. There was a large representation of the profession at his funeral at St. Andrews cemetery on February 8, and Newcastle is all the poorer for his death.

J. H.

The death occurred on February 21 at Worthing of Mr. A. J. WILSON CHAMINGS, M.B., F.R.C.S., after a long illness. Born in 1903, he was the only son of Mr. A. G. Chamings, who was for many years a much-respected official of the London County Council. After being educated at Westminster School Wilson Chamings went to Cambridge in 1922, becoming a scholar of St. Catherine's and graduating B.A. in 1925. In this year he entered St. George's Hospital for his final medical studies; while there he had a most distinguished career, and gained a large number of medical and surgical prizes before taking his Conjoint qualification in 1927 and his Cambridge M.B. in 1929. After holding three house appointments at St. George's he became F.R.C.S.Eng. in 1931. He then began to specialize in diseases of the ear, nose, and throat, and his outstanding ability and winning personality rapidly gained for him many important appointments. He was at one time registrar at Golden Square and surgeon to the nose and throat department of the Paddington Green Children's Hospital, and senior ear, nose, and throat surgeon at the Princess Elizabeth Hospital for Children. In 1932 he was appointed surgeon to the throat department of the Princess Beatrice Hospital, and then chief assistant at St. Thomas's Hospital. At the last two hospitals most of his work was done, and in a remarkably short time for so young a man his outstanding skill, conscientious work, and human kindliness were quickly recognized, and rapidly began to make a name and practice for him. In 1934 he recovered from a severe illness and started work again with his well-known enthusiasm and devotion, and in 1935 was appointed consulting laryngologist at the Woolwich War Memorial Hospital. A little over a year ago he was found to have contracted extensive pulmonary disease, and was given leave of absence from all his hospital appointments. He received with great gratitude unstinted attention from numerous medical advisers, and throughout his long and tedious illness the devoted care of his parents. Seldom has one so young crowded so much success into such a short life, or endeared himself to so many colleagues, friends, and patients, whose sympathies must surely help his parents in their loss.

Professor HERMANN KÜMMELL, the eminent German surgeon, whose death took place on February 21, was born at Corbach on May 22, 1852. After studying medicine at Marburg, Würzburg, and Strasbourg he qualified in Berlin in 1875. His first appointment was that of assistant to Max Schede, the director of the surgical department of the Friedrichshain Hospital, Berlin, whom he followed to Hamburg, where Schede was made head of the surgical department of the new Eppendorf hospital. In 1895, when Schede was appointed professor of surgery at Bonn, Kümmell succeeded him, and in 1919 occupied the first chair of surgery in the new University of Hamburg, of which he was emeritus professor at the time of his death. Kümmell is best known for his description of the syndrome, called after him, following spinal injury and consisting in pain in the neck, intercostal neuralgia, motor disturbances in the legs, and a painful gibbosity of the spine. His name is also associated with a tender point present in chronic appendicitis 1 to 2 cm. below and to the right of the umbilicus. His surgical activities, however, covered a much wider field. In addition to being co-editor with Bier and Braun in their work on operative surgery, to which he contributed the articles on operations on the kidneys, renal pelvis, and ureters, he also wrote on injuries and diseases of the brain and spinal cord, intestinal obstruction, gall-bladder surgery, injuries and diseases of the thorax, and prostatic hypertrophy.

We regret to record the death on February 23 at his residence on South Norwood Hill of Dr. ROBERT LACHLAN PINKERTON at the age of 71. He had been for many years a very active member of the British Medical Association and had taken a keen interest in public affairs in Croydon. He was educated in the University of Glasgow, where he graduated M.A. in 1884 and M.B., C.M. four years later. He proceeded M.D. in 1891. His earlier appointments included those of resident medical officer at the Surrey Dispensary and house-physician at the City of London Hospital for Diseases of the Chest. He was formerly surgeon to the Z Division of the Metropolitan Police, and civil medical officer to the Croydon War Hospital. He was honorary medical referee to the British Home and Hospital for Incurables in Streatham. Dr. Pinkerton was elected a member of the British Medical Association in January, 1894, and became one of the most prominent members of the Croydon Division. He served as a member of its Executive Committee for many years and was chairman of the Division from 1927 to 1928. He devoted himself to its interests, and did a great deal of active work on its behalf. He was also a justice of the peace for the county borough of Croydon.

We regret to announce the death on February 28 of Dr. FREDERIC WILSON STANSFIELD, F.L.S., who was for many years a leading practitioner in Reading. He was born at Todmorden, Yorkshire, on May 29, 1854, the son of Thomas Stansfield, and after schooldays at East Hardwick, near Pontefract, went to study medicine at Owens College, Manchester, graduating M.B., Ch.B. of the Victoria University in 1889 and proceeding M.D. in 1900. At Owens College he won the Platt exhibition in

physiology. After settling in practice at Reading he was appointed public vaccinator for the Nos. 1, 2, and 3 districts, and medical officer for No. 2 district. He obtained the Cambridge D.P.H. in 1893, and the subject of his M.D. thesis was the distribution and classification of cancer and phthisis in the borough of Reading during 1886–98. Dr. Stansfield joined the British Medical Association forty years ago; was chairman of the Reading Division in 1922–5; was president of the Oxford and Reading Branch in 1923–4; and had also been president of the Reading Pathological Society. He was a keen botanist and a prominent member of the British Pteridological Society. He edited the *British Fern Gazette* and contributed scientific papers on ferns to the *Journal of the Linnean Society*.

South London has lost an outstanding member of the profession in Dr. WILLIAM DENISON WIGGINS, for twenty-five years medical superintendent of St. Alfege's Hospital, Greenwich. Born in 1873 at Watlington, he was educated at Magdalen College School, Oxford, and St. Mary's Hospital. His first post was that of assistant medical officer at Fulham Infirmary, and he moved a year later to the Greenwich Infirmary, where his life work was done. At the time of his appointment the surgical work at the infirmaries was rather rudimentary, but by his firmness and tact Dr. Wiggins was able to get good surgical quarters and operating rooms. He had considerable technical skill as an operator, and his opinion was much in request for surgical cases in the district outside the hospital. He practically organized from the beginning the nursing school upon modern lines. His lectures to the nurses were highly appreciated for their insistence upon practical and intelligent ward work. In 1904 he published a handbook of midwifery for nurses and gave many refresher courses for practising midwives. He reported clinical material from time to time in the *British Medical Journal*—a case of acute intestinal obstruction in 1897 and a case of ulcerative endocarditis with perforation of ventricle in 1898. He was a man of many interests. A good all-round sportsman, he was a member of the old Blackheath Golf Club. A pigeon fancier, he raced his pigeons with the best, and played an excellent hand at bridge. He was a Mason and held the office of Grand Master of his Lodge. No account of him would be complete that left out his interest in curios of all sorts. He had a fine collection of old china and furniture, and was regularly to be seen at the Caledonian market. He leaves a son, who is a student at Guy's Hospital, and one daughter.

L. P.

The death of Dr. JULES FREDERICK REY was recorded in our issue of February 20 (p. 422), and we have now received the following appreciation from Professor J. A. Ryle: His end came swiftly after many years of ill-health patiently and cheerfully borne, and after two years of disability so pronounced that for most men life might have seemed no longer to retain any virtue or advantage. From Rey, however, the limitation or crippling of one faculty after another brought no complaint, but only the same courageous acceptance and the same unaltered determination to enjoy to the full what still remained for him. It was a rare privilege for his professional colleagues to be called to see him in one or other of his complicating illnesses and to discover always smiles in place of despondency and never to hear a whisper of defeat. Reading became difficult in the last eighteen months of his life, and his wife used to read aloud to him, but he still insisted each week on perusing the *B.M.J.* for himself. A friend, writing an appreciation of him in one of the daily papers, spoke of his "amazing pluck which seemed almost abnormal." It was abnormal, like all outstanding spiritual courage, and for those who nursed and attended him in his own home it was a constant source of inspiration and pride. Rey was born at Ashford in Middlesex on October 16, 1880, the youngest son of the well-known engineer Jules Rey. He was educated at Boulogne and Guy's Hospital, and qualified in 1904. Inheritance and example may have determined some of his special interests, for his particular enthusiasm in medicine was always centred in *x*-ray work and electrotherapy. At the West Hants Hospital as a young man he was the first to take stereoscopic *x*-ray photographs. He practised first in Cardiff and, after his marriage in 1910, at Bognor. He was much beloved by his patients, and his family circle was one of the happiest. One of the original members of the staff of the Bognor Regis War Memorial Hospital, he was partly instrumental in obtaining a generous gift for the hospital from a patient, and, characteristically, a last request was for gifts for Guy's Hospital rather than wreaths for his funeral. Among his hobbies he numbered carpentry, engraving, gardening, and photography, but his greatest hobby and interest was always his work. He leaves a widow and a daughter, and a son now at Guy's to succeed him in his profession.

The following well-known foreign medical men have recently died: Dr. FRANCESCO MAGGI, director of the ophthalmological clinic at Milan; Dr. PAUL LEGENDRE, a well-known Paris physician, member of the Académie de Médecine; Dr. WILLIAM C. BUCHANAN, professor of bacteriology in the University of Cincinnati; and Dr. HENRI DAUSSET, director of the Institute of Physiology at the Hôtel-Dieu, Paris.

Universities and Colleges

UNIVERSITY OF OXFORD

The result of the Oxford University by-election for the vacant seat in Parliament was announced on February 27. Sir Arthur Salter (Ind.) was returned with a poll of 7,580. Sir E. Farquhar Buzzard, Bt., M.D. (C.), received 3,917 votes, and Professor F. A. Lindemann (I.C.) 3,608 votes.

At a congregation held on February 27 the following medical degrees were conferred:

D.M.—W. H. Owles, D. H. Brinton.

UNIVERSITY OF CAMBRIDGE

At the Congregation held on February 20 the degree of Master of Arts was conferred on the following demonstrators in anatomy: J. S. Baxter, M.S., M.B., B.Ch.Belf.; D. V. Davies, M.B., B.S.Lond.; M. T. Greig, M.B., Ch.B., B.Sc. (N.Z.); and W. R. M. Morton, M.D.Belf.

ROYAL COLLEGE OF SURGEONS OF ENGLAND

Museum Demonstrations

A course of museum demonstrations in the theatre of the College commenced on March 1, when Mr. R. Davies-Colley showed specimens illustrating diseases of the thyroid gland. To-day (Friday, March 5) Mr. A. J. E. Cave will speak on anatomy of the knee-joint, on March 12 on the anatomy of nasal fossae and sinuses, and on March 19 on the anatomy of the trigeminal nerve. On March 8 Mr. L. W. Proger will show recent additions to the museum, and on March 15 Dr. C. Keith Simpson will speak on the pathology of the adrenal gland in relation to sudden death. All the demonstrations commence at 5 p.m., and are open to advanced students and medical practitioners.

SOCIETY OF APOTHECARIES OF LONDON

The following candidates have passed in the subjects indicated:

SURGERY.—E. S. Dismorr, B. T. Jones, J. E. R. Palmer, B. A. R. Pitt, A. W. B. Perren, J. R. Rocyn-Jones, R. L. Williams.

MEDICINE.—J. D. Anderson, R. F. B. Bennett, H. A. Bhuttacharji, S. M. M. Niall, G. G. Sahasrabuddhe, R. G. Stitt, G. Theophilus.

FORENSIC MEDICINE.—J. D. Anderson, R. F. B. Bennett, H. A. Bhuttacharji, J. T. Boocock, S. M. M. Niall, G. G. Sahasrabuddhe, R. G. Stitt, G. Theophilus.

MIDWIFERY.—J. D. Buckner, J. W. Cazalet, F. T. Futers, O. I. Green, W. A. Groom, S. J. Nathan, R. G. Stitt.

The diploma of the Society has been granted to R. F. B. Bennett, H. A. Bhuttacharji, J. T. Boocock, J. W. Cazalet, E. S. Dismorr, F. T. Futers, J. E. R. Palmer, J. R. Rocyn-Jones, and R. L. Williams.

Medico-Legal

BLOOD GROUPS IN CRIMINAL IDENTIFICATION

A recent motoring case tried at the Central Criminal Court gave an interesting illustration of the manner in which evidence of blood groups may supplement other evidence of identification. A motorist struck and killed a woman and drove on. The police were able to trace the car, and found it at the premises of the accused, with the offside back wheel covered with blood. The accused denied before the magistrates, but afterwards admitted, that it was his car. Dr. G. Roche Lynch gave evidence that the wheel and hub-cap had become blood-stained while the car was moving with blood of the O group. At one spot on the rim there was a small quantity of woollen material which exactly tallied with the wool of the jumper worn by the woman, and her blood was also of group O. The evidence, therefore, was quite sufficient without the correspondence of the groups, and indeed this group is common to about half the population. Nevertheless it is easy to imagine a case in which there would be no distinctive woollen material caught up by the car but merely a quantity of AB blood on the wheel corresponding to a deceased of group AB—a group found in only 3 per cent. of the population. The legal value of the blood groups is only beginning to be understood in this country—perhaps because evidence based on them is always bound to be negative and eliminatory rather than positive. Nevertheless they are a valuable stand-by in the investigation of crimes of violence, as well as in the determination of non-paternity, as Drs. Harley and Roche Lynch showed in a recent issue of the *British Medical Journal* (January 23, p. 163).

Medical Notes in Parliament

On March 2 the National Health Insurance Act (Amendment) Bill passed through committee in the House of Lords. The operative clause of the Bill runs thus: "Subsection (2) of Section forty-one of the National Health Insurance Act, 1936 (which provides for prohibiting arrangements for the dispensing of medicines being made with persons other than persons who are entitled under the Pharmacy and Poisons Acts, 1852 to 1933, to use the title chemist and druggist) shall have effect, and shall be deemed always to have had effect, as if for the words 'entitled under the Pharmacy and Poisons Acts, 1852 to 1933, to use the title chemist and druggist' there were therein substituted the words 'registered pharmacists or authorized sellers of poisons within the meaning of the Pharmacy and Poisons Act, 1933.'"

The House of Commons this week discussed foreign affairs and made progress with the Defence Loans Bill. The Deaf Children (School Attendance) Bill was read a third time by the Commons on February 24. On March 1 the Lords' amendments to the Regency Bill were agreed to, and the Geneva Convention Bill was read a third time. The Local Government (Financial Provisions) Bill passed through committee. Mr. Elliot on March 1 presented the Local Government (Financial Provisions) (Scotland) Bill, which amends Part III of the Local Government (Scotland) Act, 1929, and repeals, so far as relates to Scotland, Section 45 of the Unemployment Assistance Act, 1934.

The Conservative Party Committee on Nutrition met on March 2, and was addressed by Dr. Nash, medical officer of health for Heston and Hounslow. Dr. Nash gave a demonstration of cheap foodstuffs which are readily available.

The Parliamentary Medical Committee arranged to meet on March 4 and hear an address from Dr. Bousfield on diphtheria immunization.

Pasteurization of Milk

Mr. ROBERT MORRISON asked the Minister of Health on February 5 whether, in view of the evidence contained in the annual report of the chief medical officer of his Department for 1935 of serious outbreaks of scarlet fever solely due to the sale of raw milk, he would consider the making of regulations providing for the compulsory pasteurization of all milk.

Sir KINGSLEY WOOD replied that he had no power to make such regulations.

Health of Ex-Service Men

On February 22 Captain COBB asked the Minister of Pensions whether he was aware that many ex-Service men were said to be becoming prematurely aged or incapacitated as a result of the general after-effects of their war service and should receive pension for their condition; and whether he would make a statement upon the attitude of his Department to such cases and the possibility of pensions being granted.

Mr. H. RAMSBOTHAM said his attention had been drawn to certain statements to that effect, which might tend to rouse hopes that could only be disappointed. He had no power to award compensation for disablement other than such as resulted from specific injuries or ailments which were established to be traceable to war service. Consideration of other conditions not so established would be the concern of other services. Inquiry into the matter had not disclosed any evidence from general medical experience which would support the suggestion that there was greater likelihood of premature incapacity among ex-Service men than in other sections of the civil community of similar age. Inquiries were being pursued by the British Legion and other ex-Service men's associations the results of which would be laid before the Minister or Ministers whose Departments might be concerned.

Supplementary Estimate for Agricultural Education and Research

The House of Commons, in Committee of Supply on February 22, discussed a Supplementary Estimate for salaries and expenses of the Ministry of Agriculture and Fisheries and grants in respect of agricultural education and research. Mr. W. S. MORRISON said that there was a small sum of £750 for grants-in-aid of annual expenditure on colleges and institutions. The whole question of veterinary education was being investigated by a committee, and until it had reported they would not properly know what were the requirements for the future conduct of this vital part of education. The sum was for the maintenance of the Veterinary College as it was at present, pending the receipt of the report of the committee and a detailed scheme of veterinary education. The additional sum of £48,300 for diseases of animals included £40,000 on grants for compensation in respect of foot-and-mouth disease. There was no outbreak of the disease at all in the first five months of the financial year, but between September 1 and the date of the submission of the Estimate there were sixty-five outbreaks. In this case the Ministry was estimating for expenditure in this year on any outbreaks which might occur before March 31st. There had been an increase on the item with regard to cattle slaughtered under the Tuberculosis Orders. This was due to the increasing vigilance of the local authorities and the farmers in reporting disease in their herds and making use of the provisions for its elimination. That was a healthy symptom. It was also due to the fact that in many cases animals were condemned at an earlier age when they were normally more valuable. That might also be taken as a healthy symptom, showing that both farmers and local authorities were taking their duties

seriously in this matter and were making progress in dealing with this vital problem of cleaning up our herds. The £600 provided for research work under the Diseases of Fish Bill was to pay a man to test fish to see whether or not they were suffering from furunculosis.

Replying to Mr. Short, Mr. MORRISON said that Sir Frederick Hobday had retired from the Royal Veterinary College because of age. His distinguished services had been fully appreciated. The research into foot-and-mouth disease had been carried forward with the utmost energy, and some of the results obtained had been very creditable.

The vote was agreed to.

Bedeaux System in Factories

On February 23 Mr. HARDIE asked the Secretary of State for War whether the Bedeaux system or the Taylor system was employed in any of the works or factories receiving contracts from his Department.

Mr. DUFF COOPER said he had no precise information regarding the extent to which these systems were employed by War Department contractors, but he understood that a number of contractors made use of the Bedeaux system or some modification of it.

Mr. HARDIE asked if Mr. Duff Cooper understood that destruction of the nervous system which took place among workers who were so treated, and if he would take steps now to save the nervous system of persons whom he might require before long, so that he might have these men with completely unbroken nerves instead of men with nerves shattered by a stupid system.

No reply was given.

Exchequer Aid to Local Authorities

The second reading of the Local (Financial Provisions) Bill was moved in the House of Commons by Sir KINGSLEY WOOD on February 24. He said this was the first revision of grants made under the Local Government Act, 1929. The Act had proved a successful measure for local government and social reform, and no one desired to revert to the old percentage system of assistance to local authorities. The block grant which had replaced that system had assured for local authorities a considerable pool for expansion of their services, and administration had been emancipated from unnecessary interference by State Departments. In 1933 a further sum had been added to the pool. At that time anxiety was expressed whether the standards of the health services would be maintained under the new system, but it would not now be gainsaid that much had been achieved since 1929 in securing that the services of local authorities reached a higher standard. Since that year there had been considerable development in rural sewerage and water schemes, and loans sanctioned for rural works and sewage disposal had grown from £292,000 in 1932–3 to £1,000,000 in 1935–6. In 1929 fears were expressed concerning the maternity and child welfare services. In 1929–30—the last year of percentage grants—expenditure on maternity and child welfare in England and Wales was £2,400,000. In 1934–5 this expenditure had risen by 25 per cent. The expansion of all services during this period was 9 per cent. The present Bill would fix the annual general Exchequer contribution at £46,172,000 for the third fixed-grant period. The net money addition annually for the third grant period was £2,250,000, and local authorities were also to be relieved of an annual expenditure of £2,750,000. The Bill was designed to improve the method of distribution so that the grants should be allocated still further according to need, and special and necessitous areas should obtain substantial assistance.

Mr. ARTHUR GREENWOOD criticized the distribution of the grant and held that more money should go to struggling industrial towns. The poorest towns had more people to support. He quoted from a memorandum sent to the Prime Minister from the Children Minimum Council, which stated that out of sixteen maternity and child welfare authorities of which the council have particulars for 1935 and where the unemployment rate was over 25 per cent. in September, 1935, six gave no free milk to children between 3 and 5 years old, four gave no free milk between the ages of 1 and 5, and one gave no free milk to expectant mothers. More heroic measures, Mr. Greenwood said, were required than the present Bill or else the deepening poverty in the distressed areas would affect the physique and the morale of the people there.

Sir FRANCIS FREMANTLE said no possible extension of the formula would really cover the needs of the distressed areas, which would have to be dealt with by other means. Since 1929 the country had had seven years' experience of the block-grant system and he tested its results by one phase of social service—maternity and child welfare. It was said in 1929 that the percentage grant would sterilize the whole movement and do away with the incentive to progress. Actually in 1922 infant deaths per 1,000 births numbered 77, in 1929 they were 74, and in the last seven years they had fallen to 57. Taking infants in the first three months of life the mortality was 47 per 1,000 in 1922, 44 in 1929, and in the next seven years it fell to 39. There was no reduction in the figure for the second three months of life during the seven years before the 1929 Act came into force, but in the subsequent seven years the figure fell from 11 to 8. In the last half of the first year of life there was no reduction in mortality in the seven years before the Act came into operation, but in the last seven years there had been a reduction from 19 to 10 deaths per 1,000. Similarly, mortality in the second year of life had been reduced from 24 to 10 per 1,000; in the third year from 10 to 5 per 1,000; in the fourth year from 6 to 3 per 1,000; and in the fifth year from 4 to 3 per 1,000. That was a thermometer of public health.

Mr. ROBERT HUDSON replied to the debate and the Bill was read a second time without a division. A financial resolution authorizing the necessary expenditure under the Bill was immediately passed without discussion.

Approved Societies' Additional Benefits

Mr. JAMES GRIFFITHS asked, on February 25, if the Minister of Health knew that the disparity between the additional benefits provided by approved societies under the National Health Insurance Acts had a serious effect upon the position of the poorer societies; that members sought to be transferred to the richer societies that provided higher additional benefits; and whether he proposed to take steps to co-ordinate the administration of the Acts to provide uniform benefits for uniform contributions. Sir KINGSLEY WOOD replied that he was aware of these considerations, but statutory provision was already made for the protection of any society against transfer of membership due to unfavourable valuation results. Equalization of benefits would be incompatible with the retention of the approved society system of administration, and he saw no sufficient reason for altering that system at the present time.

Factories Bill in Committee

Consideration of the Factories Bill by a Standing Committee of the House of Commons began on February 25. On Part I—Health (General Provisions)—discussion began on Clause 1 (Cleanliness).

Mr. RHYS DAVIES moved an amendment to provide that the cleaning of the floor in every workroom at least once in every week as the Bill directed should be done when work was not going on in the workroom. Mr. GEOFFREY LLOYD said the clause had been framed to give the Home Office control over methods of cleaning other than washing, for the purpose of preventing objectionable means being used. Factory inspectors would take the view that if clouds of dust were raised to the annoyance and inconvenience to the work people that was an unsuitable method of cleaning.

Mr. HOLLINS said that in the pottery industry special regulations provided that cleaning should be done outside the working hours because of the danger of dust. The Bill ought to make provision to cover cases where the dust was of dangerous character. Mr. LLOYD said an amendment later on would enable stringent provisions to be enforced by the Home Secretary in food factories. The Minister of Health had in

preparation a Bill dealing particularly with conditions in food factories, and the point would be adequately dealt with thereby. The provisions in the clause under discussion were general and without prejudice to the powers of the Home Secretary to make special regulations such as those mentioned by Mr. Hollins for health and safety in dangerous trades.

An amendment, moved by Mr. GRAHAM WHITE, to authorize the use of "other suitable detergent" instead of soap was accepted. Clause 1, with a further small amendment, was then carried.

On Clause 2 (Overcrowding) Mr. RHYS DAVIES moved to leave out a proviso permitting a lower standard of cubic space per worker for five years after the passing of the Bill and thereafter where effective mechanical ventilation was provided at the expiry of that period. The Bill laid down that in respect of every workman employed in the factory there must be a minimum space of 400 cubic feet. The Bill proceeded to qualify that in a way which weakened the purpose of the clause. Amendments tabled by Sir John Simon would in part remedy this. He invited Mr. Lloyd to explain what was meant by these amendments.

Mr. LLOYD said there was no other way to meet the varying conditions of British industries except by these elastic powers. These provisions had grown up under the inspiration of factory inspectors and worked well, so the Government was not making any general departure from the old system under this Bill. In a certain number of cases, mainly of small concerns particularly in the clothing trade, an increase of the minimum cubic space per head from 250 to 400 cubic feet would involve hardship not only on the occupiers but on the workpeople. These concerns existed in crowded areas of big cities, and the new standard of 400 cubic feet if immediately imposed would force the enterprises to close down or to discharge the people who could not be accommodated under the new provisions. The Bill gave an elastic provision in view of the fact that modern research on ventilating and overcrowding had found that movement and circulation of air were more important than the gross cubic feet of space available for individual workers. The Home Office recognized that it was desirable to lay down conditions as soon as possible, and would therefore put down amendments in terms practically the same as those proposed by Mr. Rhys Davies, and would also take power to bring the condition about mechanical ventilation into operation before the end of the five years in special cases.

Mr. ALFRED SHORT said the Labour Party was not satisfied with the provision of 400 cubic feet, and he had an amendment down to increase the cubic air space to 500 cubic feet. Mr. LLOYD said he did not think this increase reasonable. It was not intended that the provision authorizing a small air space where mechanical ventilation was provided should be interpreted as referring only to ventilation produced directly by fans. He pointed out that the International Labour Office standard was 350 cubic feet, or less than that in the Bill. Mr. RHYS DAVIES said that from 1875 a minimum of 300 cubic feet had been compulsorily in common lodging-houses. Mechanical ventilation was only a second-best safeguard. Mr. Rhys Davies then withdrew his amendment, and said that the Labour Opposition would reconsider its attitude on the whole question during the report stage.

The committee then adjourned the discussion of the Bill until March 2.

Public Gas-proof Shelters

On March 1 Mr. WILSON asked the Home Secretary what plans had been made by the Air Raid Precautions Department for the provision of gas-proof shelters for public use equipped with filtration units and pumps. Mr. GEOFFREY LLOYD replied that it was proposed that so far as possible members of the public should remain indoors in a part of their home or place of work which had been adapted as a refuge in accordance with instructions which would be issued. The provision of refuges for persons caught in the street when a raid was imminent was under consideration: but while the equipment required in public refuges must depend on the nature of the premises employed for the purpose it was considered that if ordinary safeguards were employed the installation of filtration plant would not be required.

Mr. WILSON also asked the Home Secretary if the Air Raid Precautions Department could state by what test, in its opinion, ordinary people could detect the presence of mustard gas or lewisite without having to breathe it. Mr. LLOYD said that mustard gas and lewisite could be detected by visual observation or by sense of smell which might suffice to give warning without any harmful effect. Arrangements would be made for the detection of poison gas as part of the air raid precautions organization, and if members of the public were in danger of inhaling poisonous vapours every effort would be made to warn them of the presence of gas before they had to ascertain it for themselves.

Mr. LLOYD, replying to Mr. Parker on March 1, said that an investigation into the observations of the Cambridge Scientists Anti-war Group was carried out by the Chemical Defence Research Department and the Chemical Defence Research Committee.

Medical Services in Bechuanaland.—The total assistance from the Colonial Development Fund for schemes in the Bechuanaland Protectorate so far approved amounts to £92,228. This includes provision for three hospitals. A scheme for training native nurses in the three High Commission Territories has also been initiated, and the general administrative expenditure on medical services in the Protectorate has been substantially increased in the last few years.

Scottish Public Health Laws.—Mr. ELLIOT, replying on February 16 to Mr. Westwood, said that Scottish local authorities had expressed a desire for the consolidation of the law relating to public health. He had sympathy with their views, and was keeping the matter before him in his consideration of the report of the Committee on Scottish Health Services.

Keratitis from Mustard Gas.—Mr. RAMSBOTHAM, on February 16, informed Mr. F. Roberts that a few cases of keratitis, which could in certain instances be ascribed to the effects of mustard gas, had occurred in recent years. Eight such cases were accepted for compensation by the Ministry last year. This was a rather higher number than in the previous year.

Maternal Mortality Report.—The report on the special investigations recently made by officers of the Ministry of Health into maternal mortality in various parts of the country is now being printed for early presentation to the House of Commons.

Infant Mortality in Scotland.—Mr. Elliot furnished Mr. Rhys Davies on February 18 with tables showing the ten public health areas in Scotland (that is, counties and large burghs) with the highest infant mortality rates for the quinquennial period 1931–5 and the decennial period 1921–30, together with the corresponding rates for Scotland.

Infant Mortality Rates

1931–35	Per thousand	1921–30	Per thousand
Scotland	81	Scotland	89
Glasgow Burgh..	102	Dundee Burgh ..	112
Coatbridge Burgh	102	Glasgow Burgh..	106
Greenock Burgh	98	Aberdeen Burgh	105
Dumfries Burgh	93	Coatbridge Burgh	105
Paisley Burgh ..	91	Greenock Burgh	105
Hamilton Burgh	87	Paisley Burgh ..	101
Aberdeen Burgh	86	Dumfries Burgh	100
Port-Glasgow Burgh	86	Stirling Burgh ..	95
Airdrie Burgh ..	85	Kilmarnock Burgh	94
Clackmannan County	85	Port-Glasgow Burgh	93

Mental Hospital Accommodation in Lancashire.—Sir KINGSLEY WOOD gave an assurance on February 25 that the present inadequacy of accommodation for mental patients in Lancashire was not in any way due to delay on the part of the Board of Control in approving the Brockhall Institution extension or any other schemes submitted by the Lancashire Mental Hospitals Board.

Employers' Liability Bill.—The Employers' Liability Bill, introduced by Mr. Potts, was on February 26 rejected by the House of Lords on second reading by 143 to 115. During the discussion Mr. F. A. MACQUISTEN said that as a lawyer

he remembered the time when, to secure compensation cases under the Employers' Liability Act, certain lawyers' touts followed ambulances, besieged hospitals, and had understandings with some doctors inside, who sent claimants to particular lawyers. The Workmen's Compensation Act had almost killed litigation in such cases.

Notes in Brief

In the middle of 1936 the number of persons between the ages of 60 and 65 who were insured under the National Health Insurance and Contributory Pensions Acts was estimated to be 850,000.

The Minister of Health is considering, in consultation with the President of the Board of Trade, what action can be taken to prevent the sale of geysers which are not properly ventilated or are likely to get out of order.

The overcrowding survey showed 21,794 overcrowded dwellings in Wales, of which 16,706 were in the Administrative Counties.

Medical News

The annual dinner of past and present students of the Royal London Ophthalmic Hospital will be held at Langham Hotel, Portland Place, W., on Thursday, March 11, at 7.30 p.m., with Mr. T. Harrison Butler in the chair. Secretaries: Mr. Charles Goulden, 89, Harley Street, W.1, and Mr. P. G. Doyne, 60, Queen Anne Street, W.1.

Under the auspices of the British Institute of Philosophy an address will be given by Dr. Joseph Needham entitled "Should our Rulers be Biologists?" on Tuesday, March 16, at 8.15 p.m., at University College, Gower Street, W.C. The chairman will be Professor Lancelot Hogben. Cards of admission may be obtained from the director of studies at University Hall, 14, Gordon Square, W.C.1.

The annual meeting of the Mental After-Care Association will be held at Girdlers' Hall, 39, Basinghall Street, E.C., on Wednesday, March 10, at 3.15 p.m. The speakers will include the Bishop of London, Dr. G. A. Lilly, Dr. Isobel Wilson, and Dr. Reginald Worth.

A meeting of the Association of Industrial Medical Officers will be held at the London School of Hygiene and Tropical Medicine, Keppel Street, W.C., on Friday, March 12, when there will be a business meeting at 4.45 p.m., and at 6 p.m. Mr. Eric Farmer will speak on "Accident Proneness: Suggested Factory Investigations," and Dr. F. H. C. Beards on "Organized Treatment and Rehabilitation of the Injured Workman." On Saturday, March 13, at 10 a.m., a visit will be paid to Carreras Ltd., Hampstead Road, N.W., and a tour of the clinic and works will be conducted by Dr. T. O. Garland.

A meeting of the London Jewish Hospital Medical Society will be held at the London Jewish Hospital, Stepney Green, E., on Thursday, March 11, at 3.45 p.m., when short papers will be read by Miss Muriel E. Landau, F.R.C.S., on "Menstruation," and by Dr. S. Levy Simpson on "The Menopause." Mr. A. A. Davis will also read a paper and Dr. A. Loeser will show a film on "The Hormonal Origin of Menstruation."

Dr. E. J. Bigwood (Solvay Institute of Physiology, Brussels) and Dr. Hazel Stiebeling (senior food economist, Bureau of Home Economics, Washington) will speak on nutritional work in connexion with the League of Nations on Wednesday, March 10, at 5 p.m., in the theatre of the Lister Institute of Preventive Medicine, Chelsea Bridge Road, S.W.1 (nearest station, Sloane Square). All interested are invited to attend.

At a meeting of the Metropolitan Counties Branch of the British Medical Association, to be held in B.M.A. House, Tavistock Square, on Tuesday, March 9, Dr. Cyril Norwood, president of St. John's College, Oxford, will give an address entitled "The Doctor—as Seen by his Patient." Reception and refreshments at 5 p.m.; address at 5.30 p.m.

Dr. C. S. Myers, F.R.S., will deliver a lecture on "Industrial Psychology and the Modern World" at the Royal Society of Arts, John Street, Adelphi, W.C., on Wednesday, March 10, at 8.15 p.m. Applications for tickets should be addressed to the secretary of the society.

A meeting of the Royal Sanitary Institute will be held in the Guildhall, Exeter, on Friday, March 12, at 4.45 p.m., when there will be discussions on "Parts II and III of the Public Health Act, 1936," and on "Physical and Recreational Training of the Adolescent."

The tenth annual congress of the German Association for the Study of the Circulation will be held at Bad Nauheim on March 13 and 14, the general topic for discussion being the part played by the internal secretions in circulatory disorders. Professor Edward Stadler of Plauen will preside, and the first address will be given by Sir H. H. Dale on vasodepressor substances. He will be followed by Dr. H. Rein of Göttingen, who will discuss adrenaline and allied secretions. Other subjects to be considered include the action of the hypophysis, hormones with reference to gynaecology, and thyroid disorders. Excursions and social functions will be arranged. A detailed programme of this congress may be obtained from the offices of the Deutsche Gesellschaft für Kreislaufforschung, Residenzstrasse 32, Dresden-Blasewitz.

As already announced, the British Health Resorts Association has accepted an invitation from the Bournemouth Corporation to hold a conference at Bournemouth on Saturday, March 13. The programme consists of two sessions. In the morning a discussion on "Wintering in England" will be opened by Lord Horder, followed by Sir James Marchant and Dr. K. R. Collis Hallowes. In the afternoon Professor Kestner of the Rowett Institute, Aberdeen, will open a discussion on the "Curative Action of Sea Climate," in which Sir Walter Langdon-Brown will take part.

It was announced at the annual meeting of the governors of Cardiff Royal Infirmary, held on February 25, that the Duke of Kent had consented to become president of the Infirmary. The Duke of Windsor held that office for some years when Prince of Wales.

A livery dinner, attended by the Lord Mayor and Sheriffs of London, was given by the Society of Apothecaries in the Hall of the Company at Blackfriars on February 23. The Master, Dr. A. P. Gibbons, proposed from the chair the Civic Toast, to which the Lord Mayor responded. The Junior Warden, Dr. R. H. Hayes, submitted the health of the guests, and this was acknowledged by Sir Cuthbert Wallace, President of the Royal College of Surgeons, and Mr. G. N. B. Sebastian, Master of the Skinners' Company.

The first meeting of the National Advisory Council, appointed by the Government to direct and co-ordinate its scheme for encouraging physical training and recreation among all sections of the community, took place at the Board of Education on March 3. The council was occupied for some time with a preliminary survey of the ground covered by the scheme, as well as in considering certain questions of immediate practical import. It will probably do much of its work through subcommittees and maintain close collaboration with the Grants Committee, which entered upon its duties on March 1. Both bodies have their permanent headquarters at Queen Anne's Chambers, Tothill Street, S.W.1.

During the week ended February 27 the number of deaths ascribed to influenza in the 122 great towns (including London) of England and Wales was 242, compared with 423 in the preceding week. In London the number of deaths from influenza was twenty-three, against thirty-three in the preceding week. The notifications of pneumonia in London were 101 against eighty-seven.

The number of deaths from influenza in the larger towns in Germany in the fifty-first week of 1936 was 535, as compared with fifty deaths in the corresponding week of 1935.

Letters, Notes and Answers

All communications in regard to editorial business should be addressed to THE EDITOR, BRITISH MEDICAL JOURNAL, B.M.A. HOUSE, TAVISTOCK SQUARE, W.C.1.

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QUERIES AND ANSWERS

Disfiguring Vaccination Marks

"R. F. E." (London) writes: I have been asked by a young undergraduate to remove what he considers the disfiguring marks of three vaccinations performed in his childhood. Could any fellow practitioner tell me of a safe method of doing this?

Income Tax

Mortgage with Building Society

"J." entered into a contract last July with a building society to purchase his house under a "mortgage insurance scheme," and has made some quarterly payments. Should the income tax on the property be paid by "J." or by the society?

*** "J." is liable for the tax, but as he does not deduct income tax from the interest element in the payments to the society he is entitled to some relief in accordance with the arrangement made between the building societies and the Inland Revenue. The allowance is usually in respect of the interest paid in the previous financial year, so that "J." will not receive the relief for 1936–7. This does not apply to any payments in respect of life insurance that may be made under the contract, and relief in respect of such payments should be claimed for 1936–7 onwards.

LETTERS, NOTES, ETC.

Treatment of Gonorrhoea

Dr. G. ARBOUR STEPHENS (Swansea) writes: You are to be praised for the emphasis you lay upon the need for properly accepted standards of therapeutic activity in connexion with the use of sera for the treatment of gonorrhoea as described by Dr. Anwyl-Davies. I feel that Dr. Anwyl-Davies might have dealt with the subject of the natural immunity which exists towards this disease, as well as with the variation in the rate of response by patients to even the simplest forms of treatment. Dr. Anwyl-Davies has been tempted to investigate the value of a complicated and dangerous serum, but I expect he has scorned the simple treatment which you have allowed me to put forward in the *British Medical Journal*—namely, that by means of the subcutaneous injection of distilled water. This treatment has been tried and its value confirmed by workers on the Continent, and the results I have had even in the most severe arthritic cases justify a trial at the St. Thomas's clinic by Dr. Anwyl-Davies, if only by way of control. Everyone knows that the treatment of gonorrhoea in a tuberculous subject is a much more difficult and serious matter than in one who is apparently strong. As I have shown, the severe cases of acute or chronic gonorrhoeal rheumatism occur in the "acid type" of person, and no treatment can be satisfactory until this point is realized. A person in whom the *p*H of the blood or whose "acid-base balance" leans too much to the acid side responds badly to all methods of treatment. My experience leads me to think that the arthritis is due to an added infection in gonorrhoea brought about by the introduction of a protozoon such as I think exists in acute rheumatism, and of which the Aschoff body is the encysted form. The rationale of treatment by subcutaneous injection of distilled water is that the introduction of a liquid with a high surface tension acts upon the local cells, free and fixed, causing them to discharge an antibody which reacts on the blood and renders it inimical to the parasites. Such an antibody must be naturally of a specific nature, the high surface tension of the distilled water merely helping the mobilization of the antibodies.

Prostatectomy by the Two-stage Method

Mr. MORTON WHITBY (London, W.1) writes: Mr. W. K. Irwin (*Journal*, February 6, p. 261) is to be congratulated upon his excellent results, which show a lower mortality than any previous record. Regarding the open method, there is no doubt that Mr. Irwin's two-stage procedure is the best, but I cannot agree, in spite of his success, that it should always be practised. Obviously the closed method is the operation of choice whenever it can be carried out with safety. However, I agree that time will show whether Harris's operation of plastic surgery to the trigone is warranted. I am convinced from the results of my own operation of complete closure (described in the *Lancet*, 1934) that plastic surgery of the trigone is unnecessary, as I believe, apart from prolonging the operation, post-operative pyelitis and latent stricture are liable to occur. Surely it is unsound surgical practice to perform plastic reconstruction, which is the basis of Harris's operation, in a septic area. I have found that even continuous pre-operative bladder irrigation by means of my two-way catheter will not completely eliminate prostatic sepsis, although it is the only means by which it can be reduced to a minimum. Mr. Irwin's clamp incisor for removing any redundant prostatic bar is a useful instrument, and produces highly satisfactory results. In conclusion I would say that the two-stage open method or the closed method should be advocated according to the condition of the patient, but with the evolution of prostatic surgery our aim should be to make the closed operation safe for all, since convalescence is shorter, and with careful pre-operative and post-operative treatment complications, immediate and remote, should gradually become unknown with the individual operator's improved technique.

External Use of Iodine

Dr. CHARLES BARBER (London, W.1) writes: I should like to support the conclusions of Dr. Macaulay on the use of iodine in the *Journal* of February 13 (p. 374). Iodine is certainly devitalizing, and responsible for much dermatitis and often ulceration of the skin, and stitch abscesses. I gave it up years ago unless there was nothing else available, and especially avoided it as a final application to clean operation wounds, using instead a light brushing over of the wound and surrounding skin with the old-fashioned friar's balsam (tinct. benz. co.). This has a strong antiseptic as well as a soothing and healing effect on skin and wounds, and, moreover, anchors the first layer of gauze, and so prevents movement of the dressing and possible entrance of infection. On removing the dressing the skin is always found clean and smooth and not irritated, and the stitch-holes free from suppuration. The benzoin stain is easily removed by a spirit swab. I do not know whether tinct. benz. co. has ever been supplied in a first-aid outfit, but if not I think it would be immeasurably superior to iodine.

A Cheap Transilluminoscope

Mr. E. S. GOPALAN (honorary assistant surgeon to the General Hospital, Madras), in the course of a letter in which he refers to Mr. Hamilton Bailey's description of a transilluminoscope (*Journal*, April 18, 1936, p. 798), suggests the use of a cheap and effective device. This consists of a one-foot length of ordinary hosepipe with an inner lining of black rubber and an internal diameter of about one and a quarter inches. This can be used quite effectively in broad daylight as a form of transilluminoscope—costing only about a shilling.